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PSYCHODRAMATIC TREATMENT OF PSYCHOSES[1]

J. L. Moreno
Beacon, New York

It has been established that psychoses can be treated by means of the psychodrama, but questions have been raised as to just how this treatment can be accomplished and what effect the psychodramatic treatment has upon the psychotic and his disorder.

Freud distinguished between those mental disorders in which a transference from the patient to the physician can take place and those of such narcissistic character that no transference is possible. He declared persistently that psychoanalytic treatment can be applied only to patients who can produce a transference to the analyst. Consequently, as soon as he discovered that a patient was suffering from a schizophrenia or similar narcissistic disorder, he declined to treat the patient further, stating that psychoanalytic treatment would do no good.

Now the fact that a patient is suffering from schizophrenia or a disorder of a predominantly narcissistic character does not in any way preclude psychodramatic treatment, for this treatment may proceed quite well when transference from the patient to the psychiatrist is negligible or even absent. The psychotic experiences of the patient have been incapable of adequate expression in the world of reality which is strange and unfitted to them. As long as the patient remains without psychodramatic treatment, his psychotic experiences remain in a vague and confused subjectivity, without any anchorage. The psychodramatic principle consists of providing a means for their objectification by means of the establishment of an "imaginary reality." As a matter of fact, the narcissistic element in the ego of the patient causes him to welcome a sphere in which it can realize itself to an extent which far exceeds the bounds of the "reality" principle which have hitherto confined

1. Read in part at a meeting of the Association for the Advancement of Psychotherapy on July 22, 1939.

him. It is just such a sphere which is provided by the psychodrama and the psychodramatic stage. On this stage, the auxiliary egos assist the patient to realize the rôles in which he sees himself and which he may never before have been able to actualize. By the very methodology of the psychodrama, the patient is enabled to project his psychosis as it radiates from his ego in the form of delusionary, hallucinatory or normal rôles. The auxiliary egos do not restrict the narcissistic element in the patient's ego. In the first stages of the treatment, at least, they extend it and establish--in their various rôles and on the level of these rôles--a relationship to the rôles of the patient.

The function which transference performs in the psychoanalytic treatment of psychoneuroses and which it fails to perform in narcissistic disorders is replaced, on the psychodramatic stage by new factors which operate on the interpersonal and on the rôle-to-rôle level. (For important theoretical reasons--as has been discussed elsewhere--this inter-rôle and inter-personal feeling has been called "tele' instead of "transference.") By means of this "tele," a situation has been created in which an attempt to guide and to cure can be made in the case of mental disorders which psychoanalysis has openly eliminated from its therapeutic field.

On the basis of a considerable number of cases, a working hypothesis has been established which--notwithstanding variations between individuals treated--has certain general lines of psychodramatic procedure which are common to all psychotic patients. In the center of the treatment is the patient, always, and the task of developing the psychodramatic process is--as much as possible--in his hands. The psychiatric director and the staff of auxiliary egos act as prompters and foils for the patient as he acts out the various rôles of his psychosis.

The patient may be able to present only the fragments of an imaginary world, or he may have ready a complete system or plot, with definite characters and rôles--or any degree of completeness between these two extremes. In each individual case it is the task of the auxiliary egos to assist the patient to round out his imaginary world fully and in accordance with his specific requirements. The psychodrama actually functions as a milieu which will reflect the patient's psychosis in such a way and on such a level

that he can see his psychotic experiences objectified. As the treatment progresses, this objectification begins to interest the patient and continues to do so, more and more. For him the world of reality and of socialized action has become so unstable--so "unreal" --that a new and imaginary world is a necessity as an anchor for him if his experiences are not to be permanently reduced to the level of false signals and symbols.

This "imaginary reality," so to speak, is provided by the psychodramatic principle, which operated with psychotic patients in somewhat the same way that the "reality principle" operates with non-psychotic subjects. In this imaginary reality on the psychodramatic stage, the patient finds a concrete setting in which all his hallucinatory and delusionary thoughts, feelings, and rôles are valid and in which he finds the rôles in other people which meet his own on a common footing. His social and cultural atoms become full and rich, instead of being empty and unsatisfying. He can live in a setting which is far more convincing and far truer than the reality in which he lived before and which he had "outgrown" in the early days of his delusion. This earlier reality had been uncomfortable for him because it no longer was fitted to him in his new rôles--the rôles introduced by his disorder. On the therapeutic stage, however, he finds a new "reality" which has been exactly tailored for him.

To the naïve participant or spectator it may seem, on first sight, that the exhibitions permitted the patient must lead to a deeper confirmation of his delusions. However, it is soon perceived that the organization set up within and around the patient by the psychodrama, acts--for the very reason that it is exactly fitted to him--as a much more effective restraint than the restrictions of the real world which he had been forced to burst asunder, with the result that they had ceased to exert any control whatsoever over his delusions. In his new, imaginary reality he feels comfortable and at home. This has the effect of channelizing his delusions and his functions in life-situations along a line which is integrated with the procedure on the psychodramatic stage. He no longer diffuses his efforts in vain attempts to realize some of his delusions. They are now the real stuff of life in this new reality. By supporting his hallucinations and delusions, the auxiliary egos can

keep them within the bounds of the psychodramatic "imaginary reality." This enables the psychodramatic staff to guide the patient in such a way that he actually restrains himself, and at the same time insures against any further deterioration into his psychosis. To maintain this position in regard to the psychotic patient requires constant watchfulness, and a particular lookout must be kept for any signs of new productivity on the part of the patient.

When the patient is in a productive phase, the psychodramatic treatment can keep pace with him and prevent him from going astray into an overrich delusionary development. As can be observed, once the patient is warmed up to a new range of delusions, the process becomes very rapid, due to the infectiousness one association has for another. In order to catch up with the patient's new delusions and keep the process of guidance alive, very soon after a new delusionary development begins, psychodramatic work must provide a reality--an anchor--for it. These anchors become--whenever the patient returns to the psychodramatic stage--rallying points for him around which he can develop his new delusions. The mental catharsis which takes place within the patient is not a momentary satisfaction nor is it merely a spontaneous release of pathological experiences (abreagieren). It is a full-fledged system of relationships, an auxiliary world to which the patient can return at later phases in his treatment. Hence, the pauses from one psychodramatic session to another must remain flexible, carefully timed to the patient's inner activities. In psychodramatic work, patients can just as easily be undertreated as overtreated.

In the course of our study of psychotic patients who have been living in the atmosphere of a psychodramatic "imaginary reality" for a longer period of time, we have often asked ourselves whether the presence and intrusion of common reality (which, naturally, can never be entirely prevented from influencing patients) does not weaken the effect of a great deal of the work which has been accomplished on the psychodramatic stage. In answer to this we have arrived at the opinion that the patients do not need to be <u>continuously</u> within the "reality" on the psychodramatic stage which has been tailored to fit them. It appears to be sufficient if they are placed within this imaginary world at certain crucial times, for the purpose of establishing certain <u>points of</u>

coördination of the delusion to a corresponding reality. The length of the intervals between these points of coördination does not matter as long as they keep pace with the productivity of the patient. This situation has its parallel in the life of the normal and the near-normal person. We know from psychodramatic work that a normal person, in his inter-personal relationships, does not continuously participate in the realities of other persons and objects. A great part of a normal person's life is lived in phantasies which are often as distant from the reality principle as the "phantasies of reality" of our psychotic patients are from the psychodramatic stage, its staff, and the whole method of the psychodrama.

The concept of "points of coördination" has been found to be of significance in all inter-personal and rôle-to-rôle relationships. We have already remarked it is the study of warming-up processes as they flow between persons in any inter-personal performance. Its full meaning is that a relationship between two persons does not require a continuity of tele-contact in order to be adequate. It is sufficient if this contact occurs at certain moments which we call the points of coördination. These points are a rhythmic expression of the fundamental pattern of inter-personal relationships. They make possible the great economy in the interpersonal exchange of emotions. For instance, in order to produce an adequate husband-wife relationship, it is not necessary that these rôles be actuated continuously, but only at certain moments from which the illusion of continuity radiates into the intervals between them. The same is true, of course, in friendship relations, leader-follower relationships, etc.

THE DEVELOPMENT OF THE CULTURAL ATOM IN MENTAL PATIENTS

One of the first steps to be taken with a psychotic patient is to discover how far he has been able to go by himself in the forming of an imaginary reality. We are, to be sure, to a certain extent interested in his social atom, but his cultural atom--the rôles in which he sees himself and in which he sees others in relation to his rôles--is of paramount importance to us, for it is from his cultural atom that we get our picture of his inner world. With

this picture as a base, we can proceed to paint in the firm outlines of this world which we create for him, peopling it with the persons and the rôles which his delusions demand, so that we can meet him on common ground. Let us consider how these rôles begin, grow and change.

Every rôle in which an individual operates has a certain duration, a certain lifetime. Each has a beginning, a ripening and a fading-out. A rôle, after it has served for a period in a certain function, may vanish from the manifest life of an individual, but it continues as a dynamic factor in his inner life. It becomes a matrix from which a new rôle may draw strengthening support--first by imitation and later by contrast until the new rôle establishes itself within its own sphere and in its own right. There is, therefore, a dynamic interdependence between a certain series of rôles in the dimension of time, but it is in discord with psychodramatic evidence to assume that a rôle acquired in early infancy operates like a compulsion and dominates subsequent rôles, mastering them and submitting them to its own pattern--as psychoanalytic investigators, for instance, have declared. The evidence on the psychodramatic stage suggests that a new rôle--when it is in its infancy--leans upon an older rôle until the time comes when it is able to free itself and operate alone. It can well be said that, like a cell separating itself from the parent-cell, a rôle, when it is just coming into its full and self-sufficient growth, is separating itself from the mother-pattern. In the course of time, this new rôle may become the mother-pattern for other new rôles. An illustration of this is seen in artists--like writers or painters--who, in their first efforts, religiously copy a certain form, leaning upon it, but later gradually develop their own forms.

At times, however, a new rôle may emerge instantly, without precedent and without leaning upon any mother-pattern. This is occasioned by some situation which is to such a degree original and new to the subject that he is stimulated into summoning the spontaneity necessary for the particular performance.

We have seen that cultural atoms change swiftly in the temporal dimension and in the interpersonal (the rôle-counter-rôle) dimension. These changes do not necessarily mean that the configuration of the cultural atom at one time does not have

a dynamic similarity--or even identity--with its configuration at another time. We have observed, in comparing the social atoms of a person at different times, that, although certain persons vanish from his social atom they are replaced by other persons who fulfil similar needs. It is probable that it is much the same with cultural atoms--that rôles and counter-rôles vanish and are replaced by new rôles and counter-rôles which go to make a rôle-configuration of a similar equilibrium.

We have also noted that these changes seldom take place instantaneously and completely. There is in the evolution of the cultural atom a structural carry-over from one temporal phase to the next which serves to bind together the cultural development of an individual.

TECHNIQUES

In the course of psychodramatic work with patients who are suffering from narcissistic mental disorders, we have developed a number of techniques which are of great help in forming with and for the patient this imaginary reality, this auxiliary world, which enables us to treat a psychosis of this sort. These techniques are of use not only at the start of the treatment, but later, too, when some channelization of the patient's hallucinations and delusions has been accomplished.

Our patient, when we first try to get him to act "himself" on the psychodramatic stage, may refuse to do so in any rôle which expresses a private capacity. He may be suspicious, and he may resent any intrusion on his privacy. This difficulty is overcome by a simple psychodramatic technique. The patient is asked to act out the rôle of his father or his brother, or that of any other person who is closely associated with him. In expressing these peoples' personalities and their attitudes as he sees them, he will betray a great deal of information about himself, and at the same time, about what he feels toward the person he is portraying. If the patient refuses to act as any one of these persons on some such grounds as that "it is too private" or "too personal," this same technique is varied in that he is asked to act in some symbolic rôle which seems to him to be remote from him and his close associates.

In most cases he can be prevailed upon to choose this rôle himself. If he does, the rôle will of course be one that appeals to him and, in all probability we shall find that it is one of the rôles in his cultural atom. Without being aware of it he will thus show us much of himself and his relationship to this rôle. This process of making one rôle act as an auxiliary to bring out a suppressed rôle is called the "substitute role" technique.

Another useful device in the psychodramatic treatment of a psychotic patient is the "mirror" technique. Sometimes a patient overacts when he is too eager to act as himself. In order that the patient may see himself from the proper perspective, an auxiliary ego acts in the rôle of the patient. The patient is then trained to see himself more objectively, much as in a mirror, and he learns, from watching the auxiliary ego, how to act in better relation to the realities. The mirror technique can also be used in another way. The patient may refuse to act at all, and therefore an auxiliary ego takes his place on the stage and portrays him in a series of life-situations --if possible with someone who is closely associated with the patient. If the action on the stage and the portrayal of himself is repugnant to the patient, we may hear him making comments from his place in the audience, and he may even walk onto the stage and take over the rôle of "himself" from the auxiliary ego.

Another technique comes into play when a patient has projected his system of delusions into a plot which he wants to see acted out on the stage by the auxiliary egos, in order to create for himself and the imaginary characters within his system of ideas, a psychodramatic reality. To illustrate: a patient suggested and directed a series of scenes in which auxiliary egos acted his father, his mother and himself as a little boy. He, as a small boy, was present during a violent scene between the father and the mother; this scene led to his father's leaving the house and, eventually, to his parents' separation. The patient's parents had been brought together again by the illness of their son, and they were present in the audience when these scenes were played. All

1. This mechanism was first presented nearly thirty years ago in a play: "Die Gottheit als Kommödiant" (The Godhead as an Actor).

through the action the patient watched them to see how they were affected by the actions of their representatives on the stage. This recalls the scene in "Hamlet" where the player-king and the player-queen act out a playlet before the real King, Hamlet's uncle and the Queen, his mother, the action depicting the poisoning of Hamlet's father as he imagined it had taken place. This psychodramatic technique is known as the "projection" technique.

Objectification of himself by the patient can also be accomplished by means of the "reversal" technique. The patient is asked to place himself in the rôle of someone in his social atom, and an auxiliary ego--or the actual person whom the patient is to portray, if possible--is placed in the rôle of the patient. In this situation, the patient is not only made to objectify himself, as in the mirror technique, but he must react toward "himself" in the way he thinks the person, whose rôle he is playing, would react. An illustration of the operation of this technique is provided by the case of a boy who had disclosed to two psychiatrists and a number of auxiliary egos that he was laboring under the delusion that he might turn or be turned into a girl. At a strategic point in his treatment, he was placed in the rôle of one of the psychiatrists who had heard his disclosure. Acting in the rôle of the boy, the psychiatrist was to come to the boy--now in the rôle of the psychiatrist--for advice about his fears. In this way the patient was compelled to act in an advisory capacity toward another person who was exhibiting the same abnormal ideas as those with which he, himself, was obsessed. This gave him an opportunity to test for himself the degree of responsibility and stability he had reached in the course of our treatment, and it afforded us a chance to see what degree of maturity he had attained. He seemed to be acting both himself and the psychiatrist at the same time but, by the technique of reversal, he was forced to objectify his real self and his obsession from what he conceived to be a psychiatrist's point of view.

Psychodramatic treatment can be started with a rôle which is at a considerable distance from the rôle in which the patient actually lives, or the rôle to which we wish eventually to lead him. To begin with, the private rôles of the patient are purposely eliminated from the focus of attention, just as in the technique of the substitute rôle. In this

particular technique, however, the procedure is to progress gradually from the first far-distant rôle through a series of rôles which increase in their semblance to reality, until we have arrived at the rôle in which we wish to see him. As an instance of the operation of this technique we have the case of a five-year-old boy who had a compulsion to beat his mother. We began his treatment by putting him in the rôle of a young prince, because he was able to understand that a prince "surely would not beat his mother, the Queen!" By gradually lowering the social status of the rôles he was given, he was finally brought to the point where, when he played himself, he did not beat his mother, real though she was. This technique is called the "symbolic distance" technique.

In some cases the patient will be found to be suffering from a pair of opposite attitudes. One state of mind warms him up, for instance, to the idea of self-destruction. He may have almost reached the climax--or may even be parallel with this state--when a contrary state of mind begins to argue that life has still much to offer him. Continuously forced from one extreme to the other, he finds himself the scene of a permanent conflict, one portion of his ego combatting the other portion. In obsessional neuroses and in some psychotic conditions which display symptom-patterns of this sort, the following technique has been found to bring relief: The patient's two egos, so to speak, are portrayed on the stage. The surface ego--that face of himself which he manifests in ordinary life and with which he is commonly identified--is acted out by an auxiliary ego. The deeper ego which is invisibly torturing and trying to defeat the "official" ego is acted out by the patient. The surface ego--played by the auxiliary ego--not only gives expression to the patient's ordinary superficial conduct, but fights back at the deeper ego as it is acted out by the patient. The result is an objectification of the violent fight going on between the two alternating factors in the patient's mind. This is known as the "double ego" technique.

In addition to their use in the treatment of psychotic patients with narcissistic trends, these techniques--as must be clear to any student of psychodramatic literature--have, with some modifications, proved useful in many cases of simple neurosis and generally in all types of mental disturbance to which

suggestive therapy, psychoanalysis and other forms of psychotherapy are usually applied.

THE AUXILIARY WORLD TECHNIQUE

In the course of the lives of all of us--indeed from the moment of birth on--we are surrounded or we surround ourselves with helpers (and opponents) of all sorts--parents, siblings, friends, etc., as well as rivals, competitors, etc. Unknown to them (since they are driven by the same kind of motives as we are) they operate as auxiliary egos, extensions of our egos--increasing (or decreasing) our power and welfare. With psychotic patients, the situation is, of course, the same, but the auxiliary egos in real life are, however, often incompetent and unsuccessful in bringing about the results the patient is attempting to achieve. This is probably so because, in life, these people are only accidentally in the rôle of auxiliary egos. Actually they have their own personalities, and are auxiliary egos only as a by-product, so to speak. They, themselves, are seeking to take advantage of other people as auxiliary egos, just as the patient is doing with them. These inter-personal processes work out--for some people--in a satisfactory fashion, as is indicated in sociometric charts. These lucky people ascend to a position in the group which is adequate for their needs and find themselves surrounded by a sufficient number of helpers and followers--sometimes even by too many.

There is a group of individuals, however, who do not fare so well in their development. Apparently the reason for this does not lie in a lack of ability in these individuals, but it has to do with other factors which have been discussed elsewhere (Who Shall Survive?). We are here concerned only with what these individuals do--how they behave, how they try to help themselves when they find themselves in positions of this sort. On the one hand we have the individual who is able to command such a position in the group that he is, at all times, doing what he wants and gets what he desires, and, on the other hand, we have the individual whose position is such that he gets little aid from the group and, in addition, rejects what little aid is offered him. The withdrawal-symptoms of a patient of the latter

sort are, therefore, a peripheral expression of a deeper process going on within him as well as between him and the members of the group. When the barriers between him and an ascendance in the group become too great, and when many futile attempts at social recognition and power have disillusioned him (perhaps too rapidly), he decides to substitute for his parents, friends, etc.--who have proven too weak or too disinterested--and for his enemies--who have proven too strong--certain self-created and invented personality-patterns, products of his imagination and much more satisfying for him than the real people in the real world. The result is that he becomes indifferent or hostile to the real people of his social atom and quite naturally prefers his own inventions which, like people in a fairy-tale, are at his command at any time and can be multiplied or changed whenever necessary and at a moment's notice. The fact that the patient cannot successfully exist without the help of real people--whether he likes it or not--produces a difficulty of which many of the paranoid patients we have studied were (at least in part) aware, at one time or another. It is this difficulty, among others, in which the patient finds himself, which shows a possibility of psychodramatic approach.

When our paranoid patients are brought into a milieu in which professionally trained auxiliary egos are available and who are more adequately suited to their tasks than the friends or parents of the patients, the latter are aroused to reconsider their situation and to use the auxiliary egos in their attempt at establishing a new and imaginary world for themselves which is more fitting for them than the world of reality. These auxiliary egos seem to the patients to fit better into the mental creations which they have already developed than the auxiliary egos of real life, and these new ones offer the happy advantage that they provide a bridge to the world outside which they have abandoned or which they reject. The psychodramatic auxiliary ego plays a double rôle. In the therapeutic theatre he is an ideal extension of the patient's ego in his effort to establish a sort of psychotic hierarchy, a self-sufficient world, and outside of the theatre he is an interpreter between the patient and the people of the real world. Of course the patient's attempt at self-sufficiency is, at best, only partly successful. Most of his imaginary rôles remain rudimentary and

distorted. Here, again, the auxiliary ego can act as a valuable helper to the patient in the direction of his own aspirations.

The majority of patients can be treated in the therapeutic theatre by means of one technique or another. Only a very small number resist any participation whatever in the psychodrama. In the case of patients like these, however, there remains a further psychodramatic technique, the technique of the "auxiliary world." In this technique, the patient's total milieu--wherever he may be at the time of the approach--is made the stage for his psychodrama. It may involve the assumption on the part of all persons with whom the patient comes into contact in and around the institution that they are the patient's vassals, his slaves or whatever the rôles may be which he assigns to him. The institution itself may become his castle, or his tent on the field of battle. In other words, the "auxiliary world" technique consists of transforming the whole institution and every person in it into one great psychodramatic stage with auxiliary egos on it. This, of course, takes organization and requires great sympathy and understanding on the part of every member of the staff, including service help, the maintenance staff, etc. Once this transformation is achieved, however, the institution as a whole functions toward the patient just as the psychodramatic stage would, if the patient were willing to appear on it. His stage is now the whole institution, and the treatment--the channelization, the guidance and all the rest--proceeds just as it would if he were in the therapeutic theatre.

Here are presented three typical stages in the treatment of psychotic patients with a highly developed paranoid trend. Since, by the very structure of the psychodrama, the treatment is interlocked with continuous clinical exploration of the patients, we are able to give an idea of how psychotic processes can be interpreted by psychodramatic and sociometric means, simultaneously with a description of the treatment.

A boy of fourteen years of age was transferred to us for treatment with the diagnosis of schizophrenia. His dominant delusion was that he was changing into a girl, physically and mentally. A sociometric test revealed that in the group of boys in which he moved at school he was an isolate,

unchosen by the boys and he, himself, choosing some older men outside the school--his father, an uncle, etc. On the psychodramatic stage he preferred to act in rôles of a warlike character or in those which expressed aggressive masculinity, like army officers and sergeants, policemen, district attorneys, physicians, shrewd petty criminals, independent businessmen, etc., rejecting his mother, and women and girls in general. His partners in the situations were males. When an auxiliary ego in a female rôle was forced upon him on the stage, he did not like to come near her or touch her. Although his spontaneity in mature rôles and complex situations was surprisingly great and expansive, when it came to rôles and experiences on his own age-level, his spontaneity was weak and immature--more like that of a boy far younger than he. At the beginning of his treatment he often refused to act in situations and rôles on his own age-level.

Sociometric studies indicate that, in groups of children between the ages of eight and twelve, a homosexual cleavage develops as a normal trend. Since it is the first time that boys join other boys and become male partners on the same age-level in a common group action in rôles of an aggressive character (as uncovered by psychodramatic tests), the telesensitivity may tend to extremes and leave the boys open to pathological developments ("Who Shall Survive?" p. 61 et seq.). From the point of view of the group process, this "homosexual group-cleavage" seems of great significance for the development of psychotic processes.

The treatment of this boy was successfully carried out by means of the psychodramatic techniques discussed above (especially the "projection" technique and the "mirror" technique). We succeeded in channelizing the crucial rôles in which he had been operating off and on for some years in phantasy, or in reality but hidden from everyone. In the first phase of the treatment these rôles were transformed from vague experiences into actualizations on the psychodramatic stage. In the second phase, after these rôles had become actualized by means of this objectification, they became open to correction, amplification and guidance.

A second and later stage in the development of a psychotic process (which might very well, in time, have been that of the boy described above, had

he not been treated while he was young) was illustrated by a patient thirty-five years of age. The case history suggested a similar situation during adolescence to that of the boy we have described above--a sociometric isolate when he was between the ages of eight and fourteen, attracted to rôles which expressed a great male superiority, rejecting boys of his own age and admiring older men and indifferent to the other sex. When he came to us, as was disclosed by various psychodramatic methods, he lived in a world of male rôles, a world from which female rôles were totally erased. This masculine world was organized along hierarchic lines--males expressing the greatest aggression and inspiring the greatest fear came first; males without weapons and power of any sort came last and were to be despised. The patient shifted from rôle to rôle, as required by his homicidal appetite and his craving to inspire fear; he assumed such rôles as a member of a royal family, the commander of an air-squadron and a two-gunned cowboy of the wild West. He surrounded himself with the insignia of power--toy guns, toy airplanes and hinging-knives which never were put to any real use. Symbolic short-cuts to real power satisfied him completely. His family was entirely erased from his existence.

The technique applied in this case was largely the "auxiliary world" technique. When he was transferred to us with the diagnosis of dementia praecox, paranoid phase, his phantasies showed themselves to be rudimentary in many respects. In the first phase of the treatment, therefore, we allowed him not only to talk about his cowboy experiences, for instance, but to act and dress like a cowboy in his daily life in and around the institution. We allowed him not only to talk about revolvers and guns, but actually to go and buy toy guns. And so, at least in the short-cuts which seemed to satisfy him as abbreviations of reality, he was permitted to dress, talk and act like an adventurer, a hunter, a "two-gun" man, a spy, etc. He chose, as auxiliary egos, women and children, preferably, and others in weak rôles, such as servants. He was also gentle to animals. The auxiliary egos who collaborated with him in appropriate counter-rôles were, for us, therapeutic agents, and, for him, real people who gave credence to his tales of his "experiences" and aided him in actualizing some of his infantile schemes.

The auxiliary egos also operated as translators and interpreters of his ideas and schemes into our language and intentions and, in the same way, of our therapeutic plans and schemes into situations and scenes which fitted his rôles and delusions.

In the second phase of the treatment, full advantage was taken by us of the established channels of relationships in his delusions. Our auxiliary egos, having been projected into his world and accepted within the realm of the psychodrama by the patient, could now function in an attempt at returning him to more normal situations and rôles. The goal of an approach like this was to bring his imaginary world, by means of the psychodramatic principle, into an equilibrium with the official reality so that he might be able to live in the open community without harm to anyone and without any frustration of his own aspirations.

The third stage in the development of a psychosis (and this also could be either of the two foregoing cases at a later data, provided they had been left untreated) was shown by the case of a woman of sixty. She had superimposed on her previous relationships (her social and her cultural atoms) a new system of relationships. This system was already highly organized when she was transferred to us with the diagnosis of paranoia. There was hardly anything rudimentary about her scheme. She based her scheme on her ability to "catch people thinking," and, finally, to hear voices. Her system was so efficiently organized that she could recall thoughts of other people "with the greatest accuracy." After she had lived with us for a short time she was able to hear the thoughts of the staff and the other patients. Whereas the patient described above, in the second stage of psychotic development, showed uncertainty and doubt as well as fears and worries, this patient had reached a state of conviction of safety which penetrated all her relationships.

Her system was one of persecution. A ring of crooks, led by a colored man, had threatened to rob her and attack her, physically. She loved to come to the theatre and exhibit her ability to uncover the ring of people who were persecuting her and, finally, to disclose all the injustices which people in the institution attempted against her (which she had discovered by "catching them thinking"). Her case history indicated a sociometric isolate.

Although she had been an attractive girl she had persistently rejected the advances of men and had remained unmarried. As her treatment on the stage progressed, she gradually withdrew her delusions of persecution from the ring of gangsters in the district where she had made her home and focused her delusionary field within the institution. We were therefore much better able to help her to objectify and treat her delusions than if they had been focused at a distance.

This study is based on the psychodramatic treatment of thirty-three patients. They were diagnosed, according to the usual form of classification as schizophrenia (18), manic-depressive psychosis (10), and involutionary psychosis (5). Among the schizophrenias, two thirds, or twelve, were of the paranoid type, with richly developed hallucinations and delusions.

The significant feature presented by all twelve of these patients was that "transference"--in the usual psychoanalytic sense--from the patient to the psychiatrist was either absent or negligible. Some of the patients, it is true, showed some slight evidence of transference to the psychiatrist, but it was so weak and scattered that it could not be made the basis for a continued and methodically progressive psychotherapy.

Nevertheless, by the use of psychodramatic techniques, we were able to inaugurate a systematic course of treatment in which there was a high degree of participation and leadership on the part of the patients. The psychodrama provided the patients with an environment in which their egos could expand and in which they could express their delusions and hallucinations to an extent which would have been impossible in an ordinary therapeutic situation. By means of the psychodramatic process, all the rôles which stood in need of presentation were brought out, and because of the rôle-to-rôle relationships established between the auxiliary egos and the patients, we were in a position to arrest further deterioration into the psychoses and, in many cases, to guide the patients into relationships which were better suited to a life outside the institution.

To the physician, the sociologist, and even the professionally trained psychiatrist it may seem hard to believe, on first hearing, that the drama--or dramatic techniques--may yet attain a dominant

rôle among the psychotherapies, but lack of appreciation of the significance of the drama as a therapeutic weapon is largely due to a profound ignorance of the origins of the drama from a spontaneous matrix. It is also often forgotten that the concept of mental catharsis first appeared in literature in connection with the Greek drama and not, for instance, as the result of psychotherapeutic insight. In fact, it was modern psychotherapy which appropriated this concept from the drama and neglected the relationship of psychodramatic behavior to all types of mental catharsis.

Today, however, after the successful application of psychodramatic techniques to problems of childhood and adolescence, as well as to inter-individual problems like marriage and the family and finally in the treatment of the most obscure mental aberrations, such as advanced psychoses, there can be no doubt that the avenue of approach to a field of fruitful investigation for the psychiatrist as well as the sociologist has been opened up by the method of the psychodrama. It is worthy of the scientific attention of investigators and practicioners throughout the realm of psychotherapy.

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ANALYSES OF THE INTERRELATION MATRIX BY ITS SURFACE AND STRUCTURE

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I Introduction

The interrelation matrix consisting of a rectangular tabulation in rows and columns of indicators of relations between people was described in a previous paper in this journal.[1] In thus applying matrix algebra to the data of interperson relations the units were extended: a) to include plurals, p, as well as persons, P, using the term "party" to mean either or both; b) to include qualitative as well as quantitative indicators by the device of a zero exponent on the indicator, I, thus enabling rigorous mathematical treatment of purely qualitative interrelations; c) to include any number, I, of kinds of interrelations expanding the second degree matrix of rows and columns to a third degree matrix of rows, columns and sagittal arrays; and d) to include the time dimension expressing dynamic interrelations, i.e., interactions, in a fourth degree matrix expanding the interaction for a series of periods, t in number. That this generalized matrix which compactly symbolizes the data of inter-human relations can be a useful tool we now proceed to demonstrate by outlining three types of algebraic analysis. These analyses are based on the surface of the matrix, on its party structure, and on its variances. The present paper

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1. Dodd, S. C., "The Interrelation Matrix," Sociometry, Jan. 1940.

Both of these papers summarize and extend with new data a chapter in the author's forthcoming volume "Dimensions of Society" which is in press at Macmillan's. This is a companion volume to George A. Lundberg's "Foundations of Sociology."

outlines the analyses by surface and by structure only. In order to fix thinking, another interrelation matrix from our Beirut test of social distances will be used as an example.

Social Distances between Nationalistic Plurels[2]

Scale: 0% = maximal friendliness, e.g., "I would marry --"

50% = indifference, e.g., "I would speak to on the street"

100% = maximal hostility, e.g., "I wish someone would kill --"

P = 241 Freshmen of the American University of Beirut, Syria.

		Recipients of Attitude						
Expressors of Attitude	P = 241	Jew	Armenian	Iraki	Syrian	Egyptian	Palestinian	Row Means, "Friendliness"
Jew	20	(6)	43	50	50	50	25	43.6
Armenian	20	28	(8)	45	38	40	35	37.2
Iraki	43	70	60	(4)	33	33	40	47.2
Syrian	85	58	63	43	(8)	30	28	44.4
Egyptian	20	70	20	50	33	(8)	35	41.6
Palestinian	53	75	65	45	30	30	(11)	49.0
Column Means, "Popularity"		60.2	50.2	46.6	36.8	36.6	32.6	48.8% General Mean

2. The repetition reliability of this test in this group was r = .80. The average distances from the two administrations of the test (with a month's interval) are recorded above and used in the computations to increase the reliability. The assumptions underlying the Spearman-Brown formula for increasing the reliability coefficient when the length of the test is doubled do not seem to apply here and hence is not calculated. Further details on the construction and findings from this test were reported in Dodd, S. C., "A Social Distance Test for the Near East," Amer. Jour. Sociol. Vol. XLI, No. 2, Sept. 1935. The units, (i.e., attitudinal intervals between the five statements of the test were calibrated. It is believed that this was the first and perhaps is still (?) the only social distance test constructed with calibrated cardinal units, with reliability determined, and with the two-way relations between plurels measured.

II The surface of the matrix

The surface, or contours, of the second degree matrix consists of the tops of the columns when the entry in each cell determines the altitude of its column from the horizontal page or plane on which the matrix is printed. A simple three-dimensional model is a checker board with the number of checkers piled up in one cell representing the amount of the social distance or other interrelation between the two parties represented by that cell. (For qualitatively different interrelations of i kinds, checkers of i different colors are useful, just as colored lines differentiate different attitudes in Moreno's sociograms.)

The most important property of this surface is its symmetry or asymmetry about the main diagonal arrays the cells of which contain intra-relations.[3]

The sociological concepts of "isolation," "contact," and "interaction" can be given exact operational definitions in terms of these symmetries. Perfect isolation is when the main diagonal cells have non-zero entries and all the cells in the two triangles on either side of the diagonal have zero entries.

"Contact" we define as the condition when one triangle has non-zero entries and the other triangle has all zero entries. This is one-way action as of the dead on the living, the writer on the reader, the broadcaster on the listener. In two-way action, i.e., interaction, both triangles have non-zero entries in some cells at least. Indices of the percentage of isolation, or contact, or of interaction can readily be calculated and boundary points set as desired. Such indices can be calculated without the use of the matrix, of course, but the matrix

3. The terms "in-relations" and "out-relations" are convenient to denote relations between persons in a group and between a group and other groups respectively. The terms "self-relations" and "alter-relations" conveniently denote attitudes or other relations towards oneself or towards other persons respectively. "Intra-relations" denote either or both of the in-relations of a group or the self-relations of a person; while "extra-relations" denote the out-relations of a group and/or the alter-relations of a person. "Interrelations" denote any or all of these.

provides an orderly arrangement insuring completeness in the calculation. Its geometric surface visualizes the approximation to isolation, contact, etc., just as the correlation surface visualizes the approach to the normal bell shaped, or to any other specified surface. Furthermore, matrix algebra provides rules for combining diagonal and other matrices without adding them in keeping their property as aggregates, i.e., as separate, listed items. Thus enemy states isolated from each other as far as an indicator of friendly relations goes, when a blockade is set up, become also isolated as measured by any indicator of accessibility or travel. The two diagonal matrices recording friendliness and accessibility can be multiplied together yielding a third matrix expressing both of these interrelations and preserving the aggregated, i.e., separately listed, structure of all the states who are the parties in the matrix.

Cell entries which are extreme deviants from the average stand out in the surface as "peaks" (single cells), or "ridges" of an array of cells, or "plateaus" of a bloc of adjoining cells. If the deviations are negative these are inverted into "craters," "ravines," and "basins." The significance of these spatial terms depends on the nature of the interrelation indicated in the cells. If the indicator indicates social distance, as in the Beirut test above, the single crater identifies a strong one-way attachment as in an adolescent school girl's "crush"; twin craters (symmetric about the diagonal) indicate an outstanding mutual attachment. A column outstanding as a ridge here indicates a highly unpopular party as the Jews are in the Beirut population which is predominantly Arab. A columnar ravine here indicates an unusually popular party as Americans are in this population.[4] The absence of any row ridge or ravine as shown by the fact that the average distances of each row are nearly constant (see last column headed "friendliness" in the matrix above) reveals uniformity of friendliness among these plurels, however dispersed in popularity they are. Of course these terms such as "peaks," "ridges," "plateaus," etc., are but visualizable descriptions of the matrical surface which are mathematically described by the equations of points, lines, or planes

4. From further data not presented in Table I.

with altitudes and slopes specified by the constant terms (parameters) of the x, y, and z variables representing the three mutually perpendicular coordinates of the three-dimensioned space in which the matrical surface lies. Given any specified arrangement of the arrays, the statistical moments of any specified set of cell entries enable a best-fitting point, line, or plane to be determined and its equation to be written. Definite lines and planes, whether straight or curved, can be set up as hypotheses with specified conditions and the degree of fit of the observed data determined by use of the least squares principle in calculating some appropriate form of Pearson's "goodness of fit" coefficient. Here lies a fruitful field for research.

The "atom" of Moreno's sociograms, diagrammed as a person as its nucleus with the other persons interrelated to him as its periphery with radial lines indicating the interrelations, is represented by one row and the corresponding column in the matrix. This row and column intersect at the main diagonal in the cell indicating an intra-relation (which is usually neglected in a sociogram). If the atom is unusual, his row and column will appear visually as a mutually perpendicular pair of ridges or ravines), whose altitude measures the degree of unusualness, as in leadership. Degrees of leadership, heroship, stardom, ostracism and many other concepts of interrelationship can be studied with mathematical precision in terms of the matrical surface--always assuming that the prior and more difficult job has been well done in getting better and more complete data than we now possess to enter into the cells of the matrix.

III The party structure of the matrix

Turning from these suggestions for more precise study of human interrelations by means of the matrical surface, consider next the applications of the algebraic theory of combinations and permutations in analysing the structure of the group composed of interrelated persons.

Let p denote the number of plurels in a population studied. Let each plurel divide up at maximum into subplurels according to i possible relations towards each of every possible combination of plurels. What then is q, the maximum number of subplurels?

For example, suppose smokers and non-smokers (p = 2) subdivide according as they will or will not associate with each other. What number of compartments will accommodate all preferences? Suppose people of p different mother tongues are to be grouped together according to their ability to communicate with each other. If each of the p plurels have persons speaking varying combinations of the other languages what subplurels are possible? What would be the smallest number of subplurels which would satisfy any specified set of conditions? Suppose the freshmen who took the Beirut test were assigned to their dormitory rooms which are designed for 1, 2, 6 or 10 persons according to their attitudes towards each other. How many subplurels would the six nationalistic plurels subdivide into? Would this subdividing fit the dormitory space conditions better if Arabs (Syrians, Iraqis, Palestinians, and Egyptians) were lumped together in one plurel with Jews and Armenians in either one "minorities" plurel or in two plurels? The answers to questions such as these can be developed by the aid of formulae such as those below.

First of all the total number of possible combinations of p plurels is 2^p. This is the sum of the coefficients of the binomial expansion $(a + b)^p$. This means the one combination of all p plurels, plus the p combinations of (p - 1) plurels, plus the p(p - 1) combinations of (p - 2) plurels, etc., on down to the p plurels taken singly and including the last single case of hermits where the persons refused to associate with or be interrelated with even their in-group.

Next assume that each of the p plurels subdivides according to their contact relations as defined above. This means that each plurel subdivides according to its one-way relation towards each of the 2^p combination plurels regardless of the reciprocating attitude (or other reciprocating relation) of those combination plurels. If further the boundaries of the original p plurels are to be preserved, then the number of subplurels becomes $p2^p$.

Finally, if the relations, i in number, become more than the two all-or-none relations of "will associate with" or "will not associate with," this multiplies the number of possible subplurels by i, where i is understood to mean the positive relations such as "will associate" or "will associate on condition that--" but excludes the negative relation such

as "will not associate." For all those who will not associate with specified plurels are automatically included elsewhere even if only in the residual class of hermits. The conclusion then is that

$$q = pi2^p \qquad \text{(Eq. 1)}$$

contact structures

is the possible number of subplurels into which p plurels can subdivide on the basis of i positive contact relations. This generalizes the special case where p = 2 and i = 1 which Karl Menger developed in his recent paper "An Exact Theory of Social Groups and Relations" (Amer. Jour. Sociol., Vol. XLIII, No. 5, Mar. 1938). For this case Eq. 1 gives eight possible subplurels ($q = 2 \cdot 2^2$). Menger diagrams only six as he omits the possibility of hermits who refuse even in-group association. Other special cases to fit specified conditions are readily developed.[5]

The contact structure of a population becomes more complicated when it becomes the interrelational structure where two-way inter-person relations determine the subplurels. Consider first the case of permutational structure of the population. Each of the p parties may have any one of i relations towards every party including itself. That is the interrelation matrix of p rows and p columns may have any of i interrelations written in each of its cells which are p^2 in number. As any of the interrelations of the first cell may coexist with any of i interrelations for the second, this gives i^2 possibilities. Any of these may coexist with i interrelations in the third cell giving i^3 possibilities for the three cells. Proceeding thus the total number, Q, of possible interrelational structures, counting differing permutations as separate structures is i taken as a factor once for every cell:

$$Q = i^{p^2} \qquad \text{(Eq. 3)}^6$$

Permutational interrelational structures

5. Thus if the i relations are of such a nature as to preclude the hermit category entirely the formula modified to

$$Q_1 = pi(2^p - 1) \qquad \text{(Eq. 2)}$$

6. This is the number of permutations of i things taken p^2 at a

For example if two parties (p = 2) have three possible interrelating attitudes (i = 3, namely: "attraction," "indifference," and "repulsion") the structures of this population may be represented as follows: letting each small letter (a, b, c) denote an attitude and each capital letter denote one structure in a pair of persons

"pair-structures"	attitudes in a pair	"pair-structures"	attitudes in a pair	"pair-structures"	attitudes in a pair
A	a a	D	a b	D'	b a
B	b b	E	a c	E'	c a
C	c c	F	b c	F'	c b

Here in the first three "pair-structures," A, B, C, the attitudes are mutual between the two members of the pair. The remaining six "pair-structures" D - F' have three different combinations (D, E, and F) of attitudes but six permutations (D, E, F, D', E', F'). There are altogether nine permutations (A - F') of the three attitudes when these are taken two at a time, allowing repetitions, but excluding intra-relations.

$$Q_2 = 3^{2^2-2} = 3^2 = 9.$$

Consider, secondly, the combinational structure of the population. The number of possible combinations is determined by the number, r, of possible pairs of parties and by the number, n, of "pair-structures" such as A - F above. Thus if there are three parties (p = 3), there are three possible pairs (r = 3); and if there are but two attitudes (a and b above) yielding three pair-structures, A, B, and D; then the following ten "group-structures" are possible:

(Footnote continued) time when repetitions are allowed. It is also the sum of the coefficients of the multinomial of i terms when raised to the p^2 power, $(a + b + c + \text{----} + i)$.

If the interrelating conditions are such as to exclude the intra-relations in the main diagonal cells of the matrix, leaving only extra-relations, this modifies the formula to

$$Q_2 = i^{2} \qquad \text{(Eq. 4)}$$

A A A	A A B	A B D
B B B	A A D	A D D
D D D	A B B	B B D
		B D D

The generalized formula for the number of possible "group-structures" is the number, Q', of combinations of n things taken r at a time, allowing repetitions of relations and excluding intra-relations:

$$Q' = \frac{(r + n - 1)!}{r!\,(n - 1)!} \qquad \text{(Eq. 5)}^{7}$$

Combinational inter-relational structures

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7. To calculate this r, the number of possible pairs of the p parties is the number of combinations of p things taken two at a time:

$$r = \frac{p^2 - p}{2} \qquad \text{(Eq. 6)}$$

This is the number of cells in one triangle above the main diagonal in the interrelation matrix. It is also the number of different terms in the square of the multinomial of p terms.

The number, n, of possible "pair-structures" is the number of combinations of i things taken two at a time when repetition is allowed:

$$n = \frac{i^2 + i}{2} \qquad \text{(Eq. 7)}$$

Thus for the case above of three parties with two possible attitudes, p = 3, i = 2, and r = 3, n = 3, and Q' is:

$$Q' = \frac{(3 + 3 - 1)!}{3!\,(3 - 1)!} = \frac{5!}{3!\,2!} = \frac{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{3 \cdot 2 \cdot 1 \cdot 2 \cdot 1} = 10$$

which are the ten group-structures represented by AAA,----,BDD above.

A few values of Q' may be tabulated:

Q', the number of possible group-structures,

p, the number of parties	i, the number of possible interrelations[8]				
	1	2	3	4	5
2	1	3	6	10	15
3	1	10	56	220	680
4	1	28	462	5,005	38,760
5	1	66	3,003	92,378	
6	1	136	15,504		

It is immediately evident that the number of possible structures becomes enormous. If the number of parties plus the number of interrelations exceeds eight, the number of group-structures will be in the thousands. At the lower right corner of the table where i = 5 and p = 6, as in the Beirut test above, Q' exceeds seventy million! Obviously these maxima are of more theoretical than practical use. In practice the number of group-structures may be kept to the order of less than one hundred by the following principles:

1. Actual vs. possible group structures. While there are n possible pair-structures in each pair, there will be always only one observed pair-structure. The actual structure of any given group will be specified by 2r interrelations, i.e., the extra-relations ($p^2 - p$) in number which are in the cells (other than main diagonal cells) in the interrelation matrix.

2. Grouping. Parties may be grouped to reduce p. Thus in the Beirut test with six nationalistic parties their interrelations show only three significantly different groups, the Arab majority and

8. When i = 1 Q' has a zero divisor and becomes a determinate finite quantity by the convention of neglecting the (n - 1) ! factor when it is zero. This yields the Q' = 1 throughout the second column where with only one attitude only one structure is possible regardless of the number of plurels.

the Jewish and Armenian minorities. Also the attitudes (or other interrelations) may often be grouped into similar categories of qualitative relations or into wider class-intervals of quantitative relations. Thus the five class-interval of the Beirut test could be grouped into three or even into two, such as "some degree of willingness to associate with --" and "unwillingness to associate with --." This reducing p from six to three and i from five to two reduces the possible structures from over seventy million down to just ten; while if the two minority groups were combined to make p = 2 there results only three possible group-structures--and the problem of dormitory room assignments becomes simple. Only three categories of rooms are then needed: one for Arabs only, one for Jews and Armenians only, and one for any mixture.[9]

3. Other special conditions. Further special conditions may be laid down in any specified situation. These will modify the basic formulae above, usually in making the formulae more complicated while decreasing the number of structures. Thus for the permutational structure of two parties with three interrelations Eq. 3 gives eighty-one possible group-structures which simplifies to nine group-structures by Eq. 4 on laying down the added condition that intra-relations are excluded.

Sometimes the special conditions may not exclude any possibilities completely but may assign them lower probabilities on the basis of observed frequency distributions in the past in similar data. Then the degree of probability of each group-structure may be worked out and the group-structures may be arranged in order of decreasing probability and attention may be confined to a small number of the more probable structures.

9. Single rooms for hermits add a fourth category--the formula above applies to pairs, i.e., only to rooms for two or more students.

A METHOD FOR DEPICTING SOCIAL RELATIONSHIPS OBTAINED BY SOCIOMETRIC TESTING

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The problem of how to show the relationships discovered through the use of a form of Moreno's technique so that they may be understood most clearly confronts all those who employ the technique. This article describes a method which we have found particularly valuable for depicting these relationships. By it is shown at one and the same time the individual's acceptability relative to that of other members of the group and his own primary choices.

SOURCE OF THE DATA

The method herein described has been used with data from children's classroom groups at the public school[1] as well as with data from women's fraternity groups at the University of Toronto.[2] These groups were made up of numbers varying from thirty-five to fifty-five individuals and the social relationships were obtained from choices made on four different questions. Some of these questions restricted choices to individuals actually in the group; others allowed choices to be made either from within or without the group.

The description of the method we have used in these school and fraternity groups is given in

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1. "A study of social relationships in public school classrooms." To be published.
2. "A study of social relationships in women's fraternity groups." To be published.

this paper. For purposes of demonstrating the method we here consider a purely fictitious group of only sixteen individuals. The relationships and general pattern follow closely the actual findings we have made in the real groups which we have studied.

METHOD

(a) Obtaining the data.

Each member of the group is asked to give his first three choices for associate on a certain number of bases. In the school groups we used choices based on items such as companion for one's favourite activity, companion for a classroom project, "best friend" among children actually in the classroom and "best friend" among all children known. In the fraternity questions, questions such as choice for associates on a committee, choice for roommate, etc., were asked. Each individual filled in a mimeographed form giving his choices.

(b) Analyzing the data.

Each choice is scored according to the following scale: first choice five points, second choice three points and third choice two points.[3] A form for analyzing these choices is used. (See Form I) This consists of a series of vertical and horizontal columns at the head of each of which appear the names of all the individuals in the group. The value of the choices each person makes is placed in the column below his name; the value of the choices each person receives is placed in the column opposite his name. Thus, as may be seen in Form I, Jane gave Betty choices to the value of 4 (i.e., third choices on each of two bases). Thus 4 is placed in the column below Jane's name in the square of the column opposite Betty's name. Jane gives choices of the value of 15 to Lily; 15 is, therefore, placed in the column below Jane's name and opposite Lily's. As this is the highest score Jane gives to any one person the score is encircled.

3. The reasons for assigning these values may be found in the author's "Appraisal of Children's Social Development at a Summer Camp" to be published by the University of Toronto Press during the spring of 1940.

	JANE	BETTY	JO	ROSS	RED	HELEN	KATE	HARRY	JOHN	GEORGE	DICK	MARG	MAUD	MIN	SAM	LILY		ACCEPTABILITY SCORE
JANE																		0
BETTY	4																	4
JO				3R	3R													6
ROSS			(10)R															10
RED			3R	6														12
HELEN	2	5																72
KATE	6	5			3													14
HARRY																		53
JOHN			8	2														21
GEORGE																		52
DICK				5	10													42
MARG													(20)					22
MIN		(20)																30
SAM				2	(16)													32
LILY	(15)	10																48
MAUD																		25
Choices in Group	27	40	21	18	34													

FORM I

Value of choices from each subject to every other subject

(A few of the choices from this fictions group are filled in. In actual practice the form is, of course, completed)

When the scores of all members of the group have been entered in this way the scores in each column are added. The total obtained from each vertical column shows the value of the choices the individual has given to members of the group. His choices have, of course, been made to outsiders. The total obtained from each horizontal column shows the value of choices each person has received. By glancing across the columns it may be seen whether this value of choices received (or, as we have termed it, the person's "acceptability score") is made up from several different people, as in the case of Kate, or from merely one or two people as it is in the case of Marg.

Whether or not a person's choice is reciprocated to any extent may be shown in the following way. If one glances down the column under Jo it is seen that Jo chooses Ross with a score of 10 points. Looking at the column under Ross one may see whether or not he gives any of his choices to Jo. It is found he gives Jo a choice with the value of 3. In this case Jo's choice is to some extent reciprocated and so an R is put beside his score.

This form, used as an example of the method, is only partially filled in. In practice the form is, of course, completed for each member of the group.

(c) Diagrammatic representation.

From the above form we can immediately read the total acceptability score of each individual and the highest choice each individual gives to any other person. These data may now be organized in the following ways:

(1) A distribution curve may be made of the acceptability scores. These, for this present fictitious group, are shown in Figure 1. The distributions we have obtained from both the school groups and the fraternity groups have approximated the upper half of a normal distribution curve.[4] The median in every case has been below the average.

4. For discussion of this point see "Appraisal of Children's Social Development at a Summer Camp," to appear this year (University of Toronto Press).

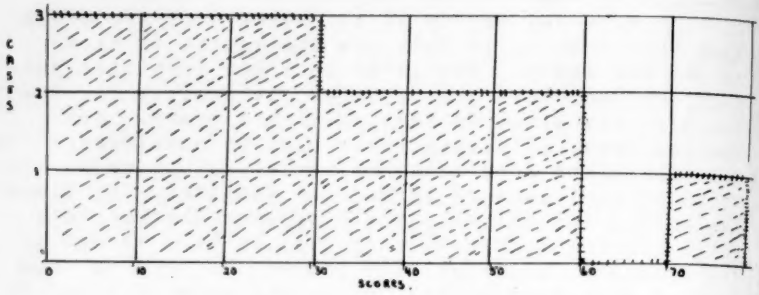

Fig. I. Distribution of Acceptability Scores

(II) A "Target" diagram may be made. Figure 2 gives an example of this. Four concentric circles whose radii increase are drawn by equal steps. The acceptability scores are divided into quartiles and each section of the target is marked off in values to correspond with these quartiles. The lowest quartile is on the outside of the target and the highest in the middle. Each subject is placed on the target in the quartile to which his acceptability score belongs. The nearer the center he is the higher his score is.

An arrow is then drawn from each individual to the person to whom he gives his highest composite choice. (This is the encircled number below his name on Form I.) Thus Jane's highest choice, which went to Lily, is drawn with an arrow from Jane to Lily on the target.

When a subject's highest choice goes to a person outside the actual group an arrow is drawn from him to the outside. See, for example, Ross on Figure 2.

If a subject's highest choice goes to a person who also gives him his highest choice a double-headed arrow is used. See Harry and George on the diagram.

In the case of a subject's choosing two persons with equally high choices, arrows are drawn from him to each of them. (See Sam, Harry and George.)

These arrows, in each case, indicate the predominating choices found within the group.

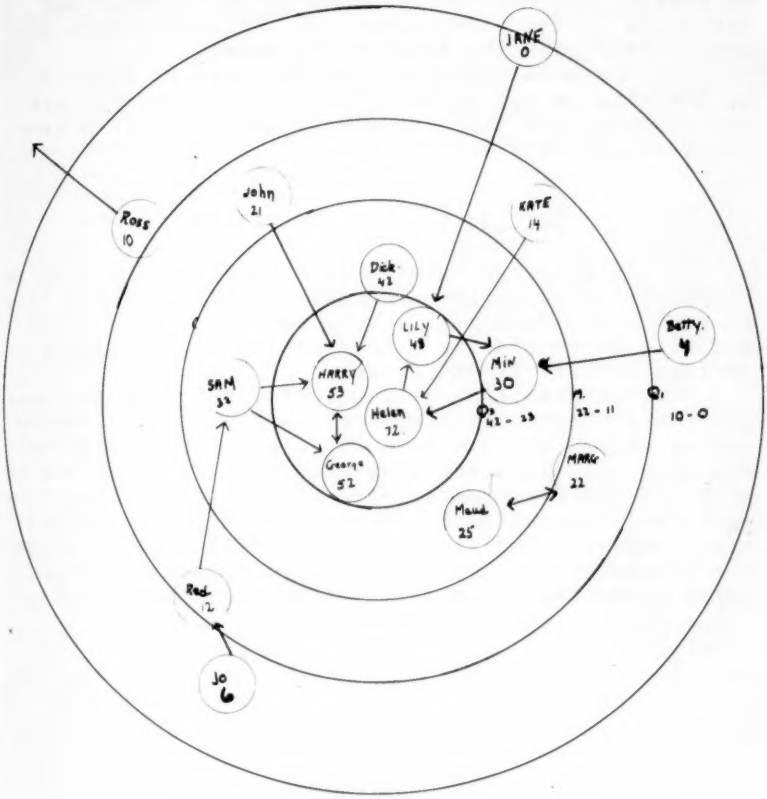

Fig. 2. Target diagram showing scores of acceptability and Predominating choices in a Social Group.

In actual practice, especially with large groups, it has been convenient to use counters with each subject's name and score written on them. (White poker chips have served admirably.) These are moved in the circles to which their score belongs and arranged to get the best "fit" among the individuals, i.e., to have as few long lines and crossing lines as possible. In plotting the diagram when public school groups are involved, we have found the task simplified

by keeping the boys on one side of the diagram and the girls on the other since, at this age, there is very little choosing between the sexes.

The subsidiary choices may also be reached on the diagram but we have found that these confuse the picture, and they are always available from consultation of Form I.

CONCLUSIONS AND EVALUATION

This method enables us to construct a diagram which will show quickly and clearly the acceptability of each individual relative to the group as a whole and also to record the predominating choices among various members of the group.

For practical purposes of indicating the social relationships in classroom groups to the teachers in charge of them this has proved to be a direct and easy means and has aroused considerable interest with the teachers concerned. For further research work concerned with the question of discovering what other individual differences are related to this factor of acceptability, the division into inner and outer quartiles has proved a useful starting point.

SOME PROPERTIES OF THE TRICHOTOMY "LIKE, NO OPINION, DISLIKE" AND THEIR PSYCHOLOGICAL INTERPRETATION

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The social research worker frequently wants a rough indication as to how a group of people feels about a comparable series of items. He may want to know, for example, how well a given school class likes a number of different teachers, or how well a group of people likes different current types of radio programs.. A simple way of answering such questions is to list the items, which may be regarded as stimuli, and to have each person in the group indicate whether he likes, dislikes, or is neutral with respect to each item. The "neutral" or "no opinion" alternative is introduced in order not to force people to make psychologically inadequate decisions.

AN EMPIRICALLY VERIFIED CHARACTERISTIC OF ANSWERS TO THE TRICHOTOMY "LIKE, NO OPINION, DISLIKE"

The result of such an inquiry is illustrated by Table I, which gives the proportions of 146 Princeton University students checking each of the three alternatives with respect to several types of radio program.

In dealing with a number of such tables in the office of the Princeton Radio Research Project, we observed an interesting regularity: the proportion of persons giving neutral answers ("no opinion" or "Indifferent to") varies less from item to item than the proportion of people giving either positive

TABLE 1

PROPORTIONS OF 146 STUDENTS "LIKING," "DISLIKING," AND "INDIFFERENT TO" 18 TYPES OF RADIO PROGRAMS

	DISLIKE p_1	INDIFFERENT TO p_2	LIKE p_3
Comedy and variety	.083	.146	.771
Serious music	.117	.124	.759
Sweet dance	.137	.116	.747
Hot dance	.260	.082	.658
Folk or band music	.507	.288	.205
Dramatized news	.379	.221	.400
Dramatic plays	.212	.165	.623
Serial stories	.806	.104	.090
News bulletins	.027	.110	.863
Amateur hours	.877	.103	.020
Quiz programs	.329	.185	.486
News commentators	.069	.131	.800
Forums, talks, discussion	.507	.299	.194
Dramatizations of historic or scientific facts	.347	.299	.354
Sports news	.189	.016	.795
Sports events	.062	.068	.870
Programs on personal problems	.743	.188	.069
Religious programs	.760	.192	.048

or negative answers.[1] This fact can be seen in Table 1 by mere inspection of the three columns. It can be checked exactly, however, by comparing the

1. The proportion of persons disliking an item will be designated by p_1 and called the negative proportion, while p_2 and p_3 will symbolize the "neutral" and "positive" proportions.

variances of the three columns.[2] These variances are as follows:

Column	Variance of Proportions[3]
Dislike (p_1)	.0748
Indifferent to (p_2)	.00608
Like (p_3)	.0936

2. The variance of a number of observations is the average squared deviation of each observation from the mean of all the observations in the sample, and is defined by the formula

$$\sigma^2 = \frac{\Sigma(X - \bar{X})^2}{n}$$

where X is the value of any observation, $\bar{X}$ is the arithmetic mean of all the X values in the sample, and n is the number of observations.

3. It might be argued that the variance of the neutral proportion ought to be smallest, because the proportions themselves are smaller. We are uncertain as to whether this is a valid argument, but in order to be on the safe side have computed coefficients of variation for the three columns. The coefficient of variation of a sample is the standard deviation of that sample divided by the mean of the sample, and is defined by the formula

$$v = \frac{\sigma}{\bar{X}}$$

The coefficient of variation is a measure of relative variability, in that it is independent of the magnitude of the proportions in the sample.

For Table 1, the coefficients of variation of the proportions in the three columns are as follows:

Column	Coefficient of Variation
Dislike (p_1)	.767
Indifferent to (p_2)	.492
Like (p_3)	.628

It will be observed that the coefficient of variation for the neutral column is smaller than the coefficient for either of the other two columns.

In order to determine whether this observation would be found to hold true more generally, we scanned our files and the published literature, and collected 15 instances in which such a trichotomy was used. Table II lists information pertinent to the discussion in this paper in the following order:

Column	Contents
1	Topic of investigation ("Topic")
2	Exact wording in which the trichotomy was offered ("Trichotomy")
3	Number of items judged by the respondents (n)
4	Number of respondents (N). If varying numbers of respondents checked different items, this fact is indicated by giving the limits to the number of respondents (e.g., 30-45)
5	Variance of the negative proportions ($\sigma^2_{p_1}$)
6	Variance of the neutral proportions ($\sigma^2_{p_2}$)
7	Variance of the positive proportions ($\sigma^2_{p_3}$)
8	Coefficient of correlation between z_1 and z_u, ($r_{z_1 z_u}$) two measures which will be discussed later in this paper.

Table II shows that in each of the 15 instances where such a trichotomy was used the neutral variance was smaller than the variance of either of the other two proportions. If it can be assumed that the 15 instances of Table II represent a random selection of the use of such trichotomies, the striking consistency with which the neutral variance is the smallest is not due to chance.[4]

4. If it is assumed that the neutral variance is as likely as not to be smaller than either of the other two variances, then the probability that any one neutral variance will be smallest is 1/3. In sampling from a population with this probability, one would find 15 out of 15 neutral variances smallest much less often than one time in 1000 by chance. We suspect that this is an exceptional if unselected sample, and would expect to find at least occasionally that the neutral variance would be larger than the other variances in other data.

If one desires to use the coefficient of variation rather than the variance as a measure of variability, the conclusion will be similar but less definite. The average coefficient of variation for the neutral proportion is smaller than the average coefficient for either of the other two proportions. The probabilities that the differences

Before proceeding to the psychological interpretation of this result, we shall indicate its practical importance. Given a series of proportions such as that in Table I, the question frequently arises as to how to express the average attitude of the whole group on any single item. Three ways of answering this question are in common use. (1) An investigator often contents himself by using p_3 as in index. Thus he might characterize the average attitude of the Princeton University students of Table I toward serious music and programs on personal problems by saying that the proportion of students liking the former was .759, while the proportion liking the latter was .069. (2) Sometimes the proportions are weighted, for example by giving a positive answer a value of two, a neutral answer a value of one, and a negative answer a value of zero. In this case the value

$$p_2 + 2p_3 \text{ or } \frac{p_2 + 2p_3}{3}$$

is used as an index of average attitude. On this basis, the attitude index for serious music is .547, while the index for programs on personal problems is .109. (3) Another method is to count the "liking" response as positive and the "disliking" response as negative, disregarding neutral replies. The index in this case is simply the value of $p_3 - p_1$. The index for serious music programs on this basis is then .642, while the index for programs on personal problems is -.674.

It has been observed repeatedly that the correlation between these three indexes is very high. For example, the three most liked types of program in Table I for the three indexes are as follows:

p_3	$p_2 + 2p_3$	$p_3 - p_1$
Sports events	News bulletins	News bulletins
News bulletins	Sports events	Sports events
News commentators	News commentators	News commentators

The three least liked types of program are

p_3	$p_2 + 2p_3$	$p_3 - p_1$
Amateur hours	Amateur hours	Amateur hours
Religious programs	Serial stories	Serial stories
Programs on personal problems	Religious programs	Religious programs

(Footnote continued) between the mean neutral coefficient and the mean negative and positive coefficients are due to chance are respectively $P < .01$ and $P = .17$.

TABLE II
SUMMARY OF RESULTS

	(1) Topic	(2) Trichotomy	(3) n	(4) N	(5) $\sigma^2_{p_1}$	(6) $\sigma^2_{p_2}$	(7) $\sigma^2_{p_3}$	(8) r_{z_1} z_u
1	Reaction to books	Avoid, indifferent to, prefer	20	264	.0138	.00391	.0205	.95
2	"	"	20	658	.0113	.00274	.0174	.94
3	"	"	20	316	.0114	.00320	.0187	.65
4	"	"	20	492	.0102	.00188	.0144	.93
5	"	"	20	693	.0111	.00289	.0168	.94
6	Rating of news commentators	Poor, indifferent, good	9	---	.00574	.00265	.0113	.96
7	Rating of songs as to liking	No, neutral, yes	21	35-50	.0272	.0115	.0426	.91
8	Importance of motives for book-reading	Much, little, none	7	100	.0479	.00106	.0582	.99
9	Interest in parts of magazine	Much, little, none	5	100	.0087	.00328	.00586	.83
10	Interest in book-types	Much, little, none	11	100	.0250	.00354	.0235	.94
11	Interest in parts of							

11	Interest in parts of newspaper	Much, little, none	7	100	.0228	.0139	.0438	.32
12	Importance of motives for magazine reading	Much, little, none	7	100	.0582	.00129	.0484	.98
13	Interest in parts of newspaper	Much, little, none	8	100	.0400	.00638	.0401	.33
14	Reaction to radio programs	Like, indifferent, dislike	18	146	.0748	.00608	.0936	.97
15	Survey of opinion	Agree, ?, disagree	36	69	.0402	.00603	.0448	.94

NOTE: The 15 sets of data in this table are a selection from 25 original sets. We eliminated several sets because the wording of the question might have introduced conditions at variance with the assumptions with which we started. We thus eliminated sets based on such questions as, "Would you like more, the same amount, or less?" of different types of radio programs, because of different kinds and amounts of programs available to different respondents. It is interesting, however, that some of the rejected sets of data gave results as good as some which were included, and this may be a matter for further investigation. We also eliminated a couple of sets of data because they were based on less than 30 cases.

The rank correlation between the indexes of methods (1) and (2) for all 15 items is .996, and the correlation between methods (1) and (3) is the same, since $p_2 + 2p_3 = 1 + (p_3 - p_1)$.[5]

The similarity of rank orders obtained by methods (1) and (2) or by methods (1) and (3) may be easily explained by our empirical finding that the variance of the neutral proportion is relatively small compared to the positive and negative variances.

The correlation between p_3 and $p_3 - p_1$, assuming that the proportions are measured from their means, may be written

$$r_{(p_3)(p_2 - p_1)} = \frac{\Sigma p_3 (p_3 - p_1)}{\sqrt{\Sigma p_3^2}\sqrt{(p_3 - p_1)^2}}$$

$$= \frac{\Sigma p_3^2 - \Sigma p_1 p_3}{\sqrt{\Sigma p_3^2}\sqrt{\Sigma p_3^2 + \Sigma p_1^2 - 2\Sigma p_1 p_3}}$$

Letting $V_1 = \Sigma p_1^2$, $V_3 = \Sigma p_3^2$, $D = \sqrt{\frac{V_1}{V_3}}$, and designating the correlation between p_1 and p_3 as r_{13},

$$r_{(p_3)(p_3 - p_1)} = \frac{V_3 - r_{13}\sqrt{V_1 V_3}}{\sqrt{V_3}\sqrt{V_1 + V_3 - 2r_{13}\sqrt{V_1 V_3}}}$$

$$= \frac{1 - r_{13} d}{\sqrt{1 - 2r_{13} d + d^2}}$$

5. This is a fact which is often overlooked. It may be proved as follows:

$$p_1 + p_2 + p_3 = 1$$

$$p_3 = p_3$$

$$p_1 + p_2 + 2p_3 = 1 + p_3$$

$$p_2 + 2p_3 = 1 + (p_3 - p_1)$$

We have now to determine what happens to the value of r_{13} if the variance of p_2 is small, that is, where p_2 is relatively more constant than either p_1 or p_3. If the variance of p_2 is made smaller and smaller, the correlation between p_1 and p_3 takes on larger and larger negative values, since $p_1 + p_2 + p_3 = 1$, and the relationship between p_1 and p_3 approaches an exact mathematical relationship. When the variance of p_2 is zero, $r_{13} = -1$.

Moreover, in Table II there is no indication that the variances of p_1 and p_3 are systematically different. We may assume tentatively, therefore, that in the long run $V_1 = V_3$, and consequently that $d = 1$.

Substituting these limiting values for r_{13} and d into the formula for $r_{(p_3)(p_3 - p_1)}$, , we find

that the limit of that value as the variance of p_2 becomes very small is +1. Our empirical finding thus explains why the indexes of methods (1) and (2) or (1) and (3) show such high correlations.

We shall return to this point later to ask whether some attitude measure preferable to (1), (2), and (3) can be developed.

PSYCHOLOGICAL INTERPRETATION

To this point our results have been treated merely as a statistical curiosity. It is possible, however, to give them a psychological interpretation which increases their significance.

Let us assume that it is at least theoretically possible to discriminate among the respondents' attitudes more finely than by merely recording whether they like, dislike, or are indifferent to the various items. Let us assume further that these attitudes are normally distributed. This assumption involves no theoretical limitation, since we might mathematically convert any distribution into a normal one by an appropriate transformation of the attitude variable. Under these assumptions we shall consider the values of p_1, p_2, and p_3 as the areas of three parts of a normal distribution curve, and shall assume that the range of the attitude variable lying beneath these three areas covers the whole range of attitude elicited by that item. On this third assumption, $p_1 + p_2 + p_3 = 1$. These assumptions are

illustrated in Figure 1, where it is assumed for illustrative purposes that $p_1 = .20$, $p_2 = .20$, and $p_3 = .60$.

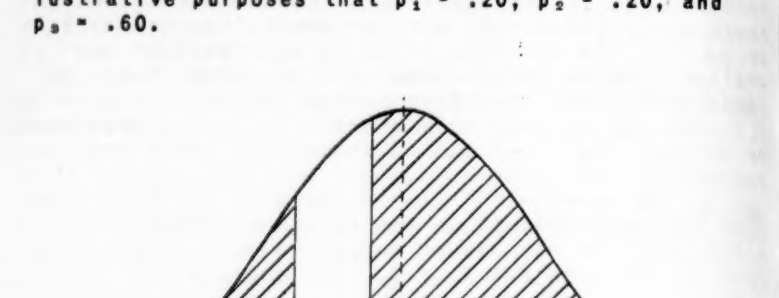

Fig. 1. Illustration of assumption that proportions of persons liking, disliking and indifferent to an item are areas of a normal distribution curve of attitude

These assumptions cannot be verified or invalidated, and consequently are of no practical importance. It is possible, however, to add an additional assumption which will make verification possible. We assume that somewhere on the attitude variable defined previously there exists what we would call a neutrality zone. By this we mean that there is a constant attitude distance, t, placed symmetrically about the zero value of the attitude variable, so that if a person's attitude falls within the neutrality zone he will say that he is indifferent to that particular item. If the scale-value corresponding to his attitude is higher than t/2, however, he will say that he likes the item, and if the scale-value of his attitude is below -t/2, he will say that he dislikes the item. (See Figure 1.)

The neutrality zone has interesting psychological interpretations which we feel might merit further study. We shall show presently that the neutrality zone actually exists in some attitude

distributions, at least to a certain extent. The neutrality zone's existence may be the result of the respondent's inability to distinguish between a weak attitude and a truly neutral attitude. A man having a slightly positive attitude, for example, might be unable to distinguish this from having an exactly neutral attitude, and might thus mistakenly call himself neutral. On the other hand, the neutrality zone probably also represents a tolerance range, in that in checking his responses to the presented stimuli a respondent tries subjectively to mark his response as neutral when it is not a strong positive or negative response. If this is the case, then the average range of the neutrality zone for a series of items will indicate the group's tolerance with respect to those items. We should expect that the tolerance range on "burning questions" would be small, and that the range on less important questions would be greater, and this expectation appears to be verified in the data we have studied so far.

It is easy to show that if a neutrality zone actually exists the variance of p_2 will be much smaller than the variance of p_1 or p_3. For example, consider two items, one of which is liked by 60 per cent of the people in a sample and disliked by 20 per cent (Curve C, Figure 2), and another which is liked by 20 per cent and disliked by 60 per cent (Curve C'). The assumed distribution curves will be symmetrically displaced on opposite sides of the neutrality zone, which has its center at zero, but the hypothetical values of p_2, the areas above the neutrality zone, will be the same in the two cases. Figure 2 illustrates this case. p_1 and p_3 have very different values for the two curves, but the two values of p_2 are equal, and the variance of p_2 is therefore zero for this particular instance.

Now the existence of such a neutrality zone can be empirically tested for any given set of data, providing that the attitude is normally distributed or that its distribution has been normalized. Since the form of the actual attitude distribution is unknown, the test for the existence of a neutrality zone becomes a joint test of the existence of a constant neutrality zone plus the normality of the attitude distribution. In order to make this test, we assume that p_1 and p_3 represent the tail areas of a normal curve as illustrated in Figure 1. By applying

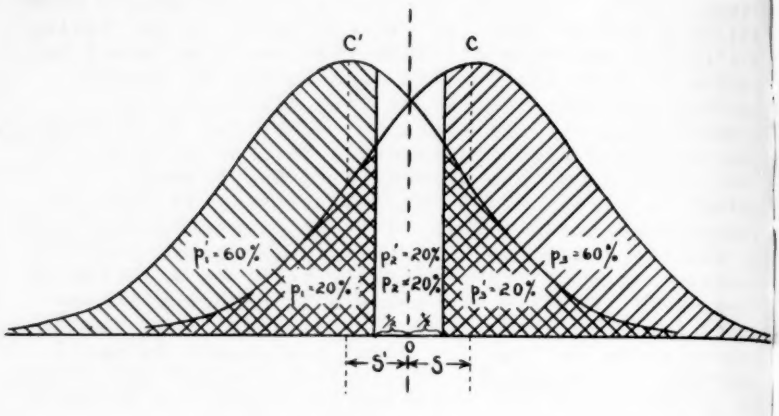

Fig. 2. Illustration showing that widely different values of p_1 and p_3 may result in identical values of p_2

to a table of the normal probability integral, which can be found in any statistical textbook, we can then find the two end-points of the neutrality zone. These two values will be designated by z_l and z_u, the l and u standing respectively for the lower and upper bounds of this zone. The assumption of a constant neutrality zone is then equivalent to the assumption that the distance $t = z_u - z_l$ computed from a series of p's such as that in Table I is constant from item to item.

If from a given list of p_1 and p_3 we compute these pairs of z-values, we can represent each pair by a point in rectangular coordinates. If t is constant from item to item, these points will all lie on a straight line, and the correlation between them will be +1, since any z_u will be equal to its corresponding z_l plus a constant. Figure 3 shows these points computed from the data of Table I.

It will be seen that the z-points in Figure 3 approximate a straight line rather well. The correlation between z_l and z_u is +.923, a value not greatly different from the +1 which would indicate that $z_u - z_l$ was perfectly constant. In this particular

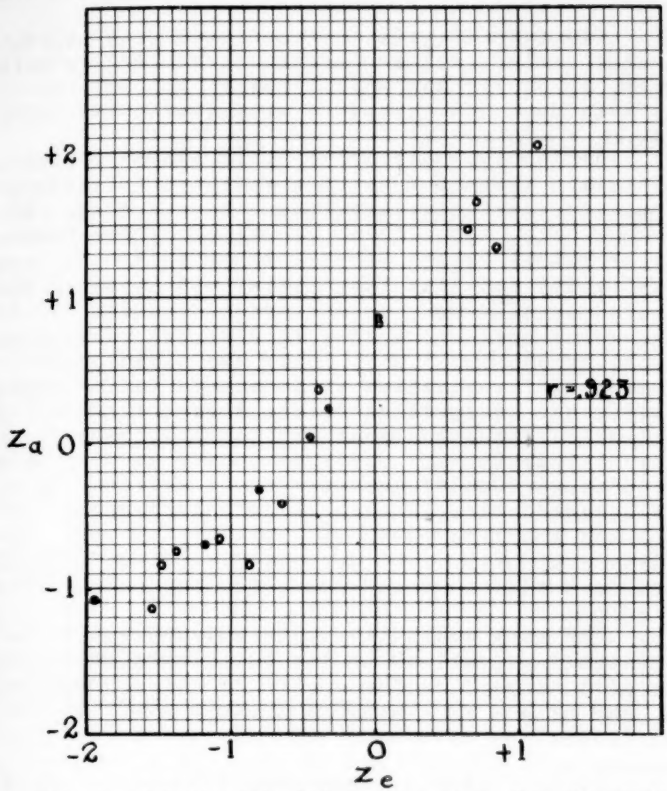

Fig. 3. Relationship between z_1 and z_u for 146 students who rated 18 types of radio program according to the Trichotomy "Like," "Indifferent to," and "Dislike"

case, over 85 per cent of the variance of z_u is accounted for by variation in z_1, leaving 15 per cent of the variance of z_u as unexplained because of inconstancy of t. For each set of data treated in this paper, Column 8 of Table II gives the value of the correlation coefficient between z_1 and z_u. It will be observed that most of these values lie rather near to +1, and therefore that this test of our psychological interpretation for the relatively more constant p_2 can be considered as affirmative.[6]

6. In interpreting these values, it is necessary to keep in

The preceding test of our psychological interpretation is a rather lenient one. It is possible, however, to devise one which is more strict, and which then does not result in as satisfactory verification.

On the two assumptions that people's attitudes toward several items are measured in terms of a normalized variable, and that a constant neutrality zone exists, theoretical values of p_2 for comparison with actual values such as those in Table I can be easily determined. Theoretical values of p_2 are generated by sliding a normal curve over the X-axis, the constant neutrality zone cutting out varying proportions of the total area under the normal curve according to its position with respect to the neutrality zone. This situation is illustrated in Figure 4*, which shows two positions of the normal curve. C is a distribution of attitude toward an item which a large proportion of persons liked, while C' is a distribution toward an item which fewer persons liked, and the zero point is at zero attitude. The constant neutrality zone obviously cuts out a smaller theoretical p_2 from the first distribution than from the second.

The area which the neutrality zone cuts out is obviously determined by the position of the normal curve with respect to the center of the neutrality zone, and we use as a measure of this position the quantity

$$S = -\frac{z_u + z_l}{2}$$

This is nothing more than the distance of the center of the neutrality zone from the center of the distribution curve, this distance being taken with a negative sign, and therefore representing the distance of the center of the distribution curve from an origin put arbitrarily at the center of the neutrality zone

(Footnote continued) mind the fact that the chance value of the correlation between z_l and z_u is not zero, as one would expect at first, but +1/2. It is easy to derive this result. In the appendix we shall derive it in a roundabout manner, however, since by doing so we shall bring to light a general formula which will often simplify problems of this kind.

*See page 173.

(zero attitude). Figure 5 gives for a number of values of t, or the neutrality distance, the value of theoretical p_2-values as a function of the position-measure S.

Figure 5 contains the fundamentals of the interpretation attempted in this report. On the horizontal axis are given values of S which indicate the position of the attitude distribution curve with respect to zero attitude at the center of the neutrality zone, this point being the origin of the coordinate system. On the vertical axis are given theoretical values of p_2 which would be expected if our assumptions actually were true, and there is a theoretical p_2 for each value of S, as we have already indicated in the preceding paragraph. The range of the neutrality zone, which is given by the value t, obviously determines the magnitude of the theoretical p_2 for any S-value, since the larger this range the greater the proportion it will cut from the total area of the distribution curve, other things being equal. From this figure we see that if S is very large or very small (i.e., if the average attitude toward the item is either very favorable or very unfavorable), then the corresponding p_2 is small, thus indicating that few people will say that they are undecided on the item. If, on the other hand, S is near zero (i.e., if the average attitude is rather neutral), then the proportion p_2 of people who neither like nor dislike the item will be large. This is a mathematical consequence of our basic assumptions. It makes good sense, provided, of course, that it is verified by actual observation.

It is obvious that the range of the neutrality zone can be affected by the instructions given when the test or experiment is carried out. If the respondents are instructed to make up their minds as to whether they like or dislike items insofar as is humanly possible, then t will be small. On the other hand, if the respondents are told to say that they like or dislike an item only when they are very sure of their opinion, t will be large. Our assumption that the neutrality zone has a constant length from item to item, therefore, is valid only for one set of data checked by one group of respondents who have received identical instructions. t will vary from group to group of respondents according to the instructions they receive, and probably also according

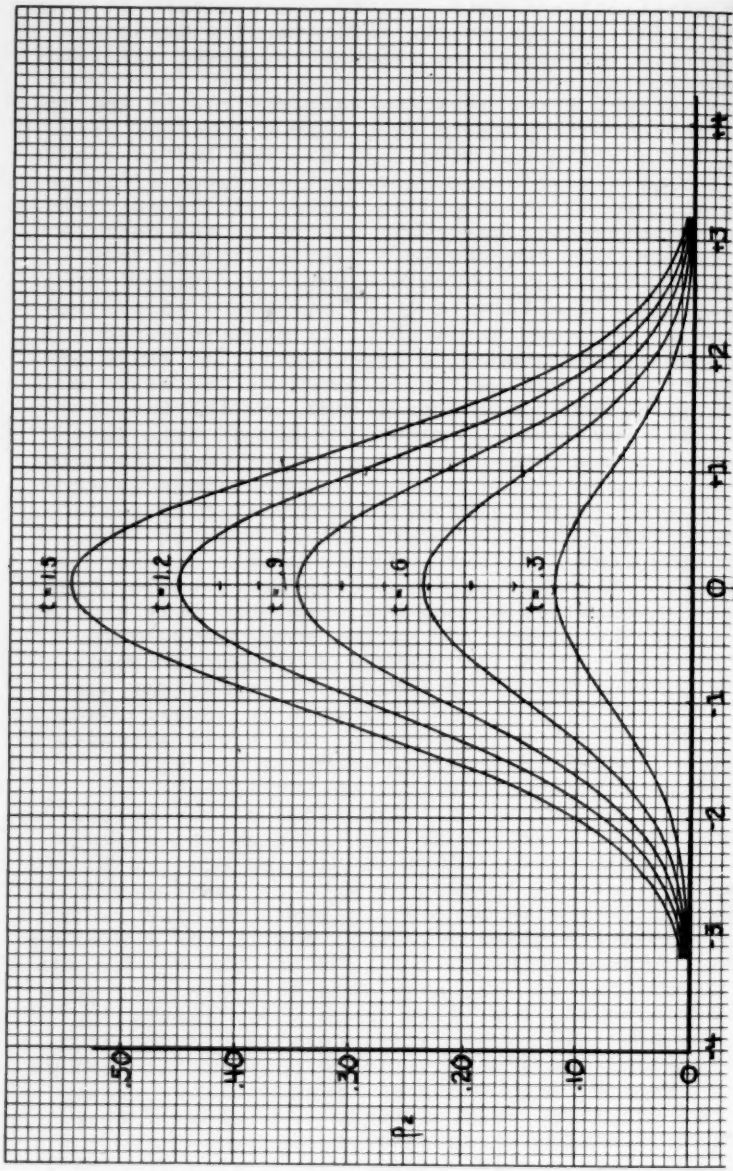

Fig. 5. Relationship between p_z and S for selected values of the neutral distance t

to the psychological constitution (e.g., tolerance range) of the persons within the group.

In Figure 6 are given three graphs, comparing actual and theoretical values of p_2 for three sets of data selected from Table II. The numbers corresponding to the graphs will serve to locate the sets of data in Table II. (3) is a comparison of actual and theoretical p_2's for the judgments of 316 Book-of-the-Month-Club members on 20 different types of books. (14) deals with the reactions of 146 Princeton University Students to 18 current types of radio programs, and is based upon the figures in Table I. (13) is taken from William S. Gray and Ruth Monroe, The Reading Interests and Habits of Adults, and deals with the opinions of 100 persons as to the degree of interest which they exhibited in 8 different parts of the daily newspaper.

The procedure by which these graphs were constructed may be summarized as follows:

Step 1: A list of items is taken and the number of people who like, dislike, or are neutral with respect to each item is transformed into a series of proportions such as that in Table I.

Step 2: The proportions p_1 and p_3 are considered to be the areas of two tails of a normal frequency distribution, and from a table of areas of the normal curve the values z_1 and z_u are determined. These are the standard deviation distances from the center of the normal curve to the points at which the two tail areas corresponding to p_1 and p_3 begin.

Step 3: For each item in the list, the difference $t_1 = z_1 - z_u$ is computed. These t's are considered to be estimates of the constant neutrality range which are subject to chance variations.

Step 4: An estimate of the true neutrality range is computed by averaging the t's from Step 3. The formula for the best estimate of the true neutrality distance is thus

$$t = \frac{\Sigma(z_u - z_1)}{n}$$

Step 5: The theoretical p-S curve which corresponds to the estimated neutrality range is then constructed. This will be one of the family of curves illustrated in Figure 5. This curve indicates, for any value of S, what value of p_2 we should find, given certain values for p_1 and p_3, if our assumptions hold true in the observed data.

Fig. 5. Relationship between p_2 and S for selected values of the neutral distance t

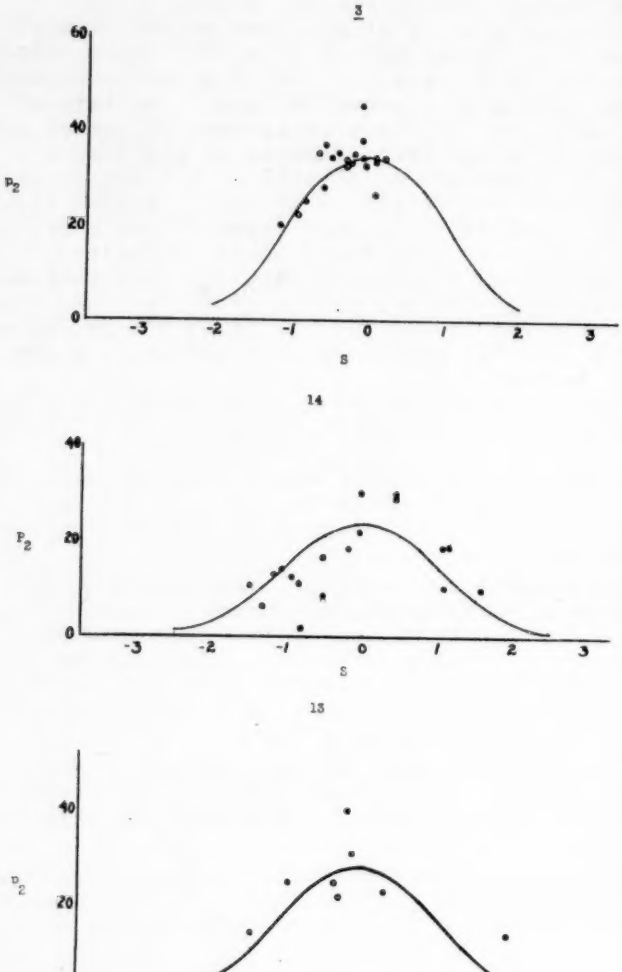

Fig. 6. Actual and theoretical values of p_2 for three sets of data from Table II. See text for description of the data.

Step 6: The actual p_2 points are then plotted over the curve of theoretical p_2's. Each point corresponds to one item on the original check list, e.g., to one type of book, one type of radio program, or whatever is being investigated. The abcissa of each point corresponds to the S-value computed for that particular item. The ordinates are the p_2's taken directly from the original list of proportions (e.g., Table I).

Step 7: We can now compare each actual point with the corresponding point on the theoretical curve which has the same abcissa. The ordinate of the theoretical curve gives the proportion of people who would say that they had no opinion on a certain item if the data corresponded to our assumptions. The ordinate of the plotted point gives the proportion of people who actually said so.

The graphs in Figure 6 indicate that the empirically determined points show a systematic if rather indecisive tendency to cluster about the theoretical curve. We have given several graphs, because so far we have been unable to find an adequate numerical expression for the agreement between theory and data. In the preceding section where we used the more lenient test that z_1 and z_u should lie on a straight line, the correlation coefficients reported in the last column of Table II afforded us an exact numerical index, so that it was unnecessary to show more than one relationship graphically.

The three graphs shown in Figure 6 are rather typical of the p-S distributions which we found in the 15 sets of data under investigation. The reader's temperament will determine whether he will feel that the result is surprisingly good, given the unprecise nature of the data, and therefore that the theory of a constant neutrality zone deserves further investigation; or whether he will feel that the discrepancies are so great that it is not worth while pursuing the matter further. We consider the present paper to be nothing more than a progress report. We hope that it will elicit comment and thus guide us in deciding whether to go on.

There are two problems with which further investigation would probably have to deal. We have some material concerning them, but our tentative conclusions do not yet warrant statement.

If we have a series of items and compute the corresponding estimate of the neutrality range, we often observe items which are obviously not homogeneous with the rest. For example, if we include an item on which a large amount of discussion has occurred, people will split cleanly in their judgments, and p_2, the proportion of those without an opinion, will be very small. These items should probably be excluded, but the problem is how to recognize genuine instances of psychological heterogeneity. We suspect that if we inadvertently leave some of these items in, our estimate of t is biased in being too small. On the other hand, on some issues there will be some people who have never considered the issue at all, with the result that they will increase the value of p_2, not because their attitude is neutral, but because they have no attitude on that issue at all. Good examples of these two difficulties occur in a list recently published in the Public Opinion Quarterly,[7] where most of the p_2's have about the same value, except on questions concerning political affiliation, where p_2 is very small, and on one question regarding a far-western state about which few people apparently have a genuine attitude at all and p_2 is very large.

A second important topic of further study would be the investigation of how the range of t is influenced by the kind of instruction given. It is possible that by proper instruction our assumptions might be made to hold with much greater precision than in our present randomly collected data.

A PRACTICAL APPLICATION

At the end of the first section of this paper we raised the question as to whether it was possible to devise a better way of characterizing the attitude of a group as a whole than by using one of the three traditional methods which we discussed. We are now able to answer this question. The position-value S which we have considered in the preceding pages is nothing but an average attitude scale-value for the entire group of respondents. It is simply the distance from the mean of the group's attitudes to the

7. Vol. 3, p. 453.

point of zero attitude. It is therefore a measure entirely analogous to a score, for example, on a Thurstone attitude test, except for the following two differences: (1) While Thurstone assumes that the ratings of the judges determine absolute scale-values (an assumption which cannot be verified), we introduce the assumption of a constant neutrality zone. To the extent that our data bear out this assumption, the present approach is preferable because it allows empirical testing. (2) The resulting scale-value, however, is an average for a group; it cannot be applied to an individual, while a Thurstone scale-value can.

The use of the position-value S as an attitude-score will be illustrated with data drawn from the files of the Office of Radio Research. From detailed records as to the preferred radio programs of 2771 persons, these persons were divided into "highbrow" and "lowbrow" listeners, the former having among their favorite programs a majority of programs such as news, serious music, forum discussions, and so on. To both groups a list of 18 types of books was given, with instructions that the respondents indicate whether they liked, were neutral toward, or disliked each type of book. By the procedure outlined above, average scale-values for highbrow and lowbrow listeners were computed for each type of book. The results are given in Table III, where the items (book-types) are listed according to magnitude of the difference between highbrow and lowbrow listener-scores.

The scale-values very clearly exhibit differences in reading tastes corresponding to differences in listening habits. Every type of book for which the highbrow scale-value is higher than the lowbrow is distinctly a "highbrow" type, beginning with biography and ending with plays. On the whole, the types of book liked more by lowbrow than by highbrow listeners are distinctly "lowbrow." There are, of course, a few exceptions, but most of these may be accounted for in terms of ambiguity of interpretation. Humor and satire, for example, are not homogeneous so far as the highbrow-lowbrow distinction is concerned, and "problem novels" probably was an ambiguous term as well.

To the degree that our assumptions are met in the data, the scale-values of Table III would permit us to talk in terms such as: Highbrow listeners like

TABLE III

PREFERENCE VALUES FOR TYPES OF BOOKS FOR 792 HIGHBROW AND 1479 LOWBROW RADIO LISTENERS

Type of book	Highbrow Listeners	Lowbrow Listeners	Difference
Biography	.98	.52	.46
Poetry	.16	-.29	.45
Arts	.38	-.01	.39
Current history	.41	.04	.37
Classics	.41	.09	.32
Science	-.04	-.21	.17
Travel	.99	.82	.17
Historic novels	.99	.84	.15
Character novels	.64	.52	.12
Religion	-.25	-.34	.09
Plays	.03	-.05	.08
Problem novels	.26	.29	-.03
Locale	.46	.55	-.09
Self-improvement	.26	.43	-.17
Humor and satire	.50	.72	-.22
Love stories	-.21	.05	-.26
Detective stories	-.23	.03	-.26
Short stories	.36	.63	-.27
Adventure	.37	.64	-.27
Pleasant stories	-.04	.35	-.39

a certain book-type twice as much as lowbrow listeners, or highbrow listeners like a certain type of book twice as much as they like another type, and so on. In the many instances where mass surveys are made for the purpose of roughly determining attitudes on different items, this way of handling the data seems very revealing.

The necessary computations can be greatly reduced by use of a table which we have prepared

(Table IV). It permits p-values to be immediately converted into average scale-values. If the proportion of persons disliking an item is p_1 and the proportion liking the item is p_3, we enter the table with these two values as arguments and immediately take out the average scale-value S at the intersection of the two entries. For example, if $p_1 = .15$ and $p_3 = .70$, we find immediately that S for that item is -.780. The table reproduced in this paper, however, is merely illustrative and useful only for rough approximations. A more elaborate table would take too much space to be reproduced here, but could be easily constructed from any table of the areas of the normal curve.

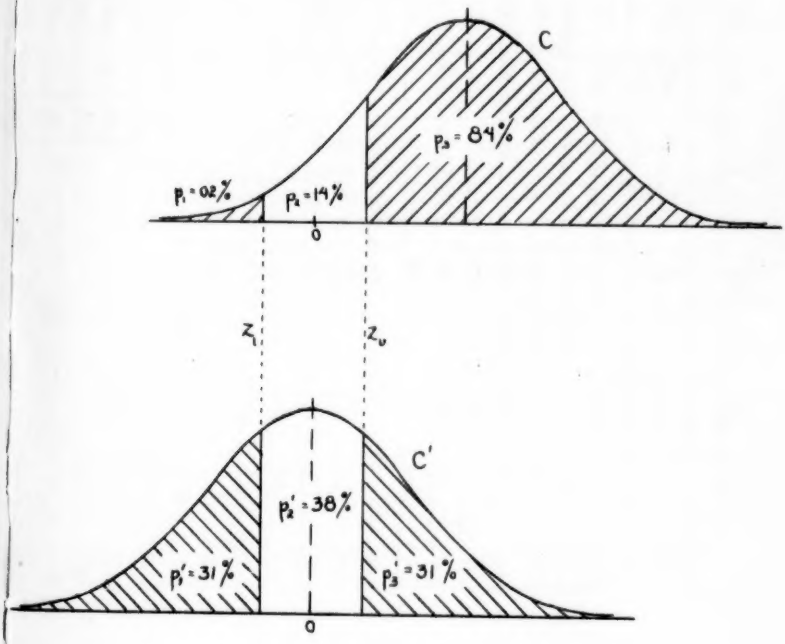

Fig. 4. Illustration to Show that p_2 Varies with the Average Attitude of the Group.

TABLE IV

P_1 / P_2	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65
.05	0	-.180	-.300	-.400	-.485	-.560	-.625	-.695	-.755	-.820	-.885	-.945	-1.015
.10	.180	0	-.120	-.220	-.305	-.380	-.445	-.515	-.575	-.640	-.705	-.765	-.835
.15	.300	.120	0	-.100	-.185	-.260	-.325	-.395	-.455	-.520	-.585	-.645	-.715
.20	.400	.220	.100	0	-.085	-.160	-.225	-.295	-.355	-.420	-.485	-.545	-.615
.25	.485	.305	.185	.085	0	-.075	-.140	-.210	-.270	-.335	-.400	-.460	-.530
.30	.560	.380	.260	.160	.075	0	-.065	-.135	-.195	-.260	-.325	-.385	-.455
.35	.625	.445	.325	.225	.140	.065	0	-.070	-.130	-.196	-.260	-.320	.390
.40	.695	.515	.395	.295	.210	.135	.070	0	-.060	-.125	-.190	-.250	
.45	.755	.575	.455	.355	.270	.195	.130	.060	0	-.065	-.130		
.50	.820	.640	.520	.420	.335	.260	.195	.125	.065	0			
.55	.885	.705	.585	.485	.400	.325	.260	.190	.130				
.60	.945	.765	.645	.545	.460	.385	.320	.250					
.65	1.015	.835	.715	.615	.530	.455	.390						
.70	1.080	.900	.780	.680	.595	.520							
.75	1.155	.975	.855	.755	.670								
.80	1.240	1.060	.940	.840									
.85	1.340	1.160	1.040										
.90	1.460	1.280											
.95	1.640												

P_1 / P_2	.70	.75	.80	.85	.90	.95
.05	-1.080	-1.155	-1.240	-1.340	-1.460	-1.640
.10	-.900	-.976	-1.060	-1.160	-1.280	
.15	-.780	-.855	-.940	-1.040		
.20	-.680	-.755	-.840			
.25	-.595	-.670				
.30	-.520					

TABLE FOR DETERMINING AVERAGE SCALE VALUES "S" FOR A SERIES OF TRICHOTOMIES

APPENDIX

The values in Column 8 of Table II are correlation coefficients between two points on a line which has a constant length from item to item, viz., the total attitude range. In order to determine the value of the chance correlation between z_i and z_u on this line, we need to set up a mathematical model for the correlation between two points whose positions on a line of constant length are determined purely by chance.

Suppose we take a straight line with constant length k. Suppose then that we fix two points on this line either at random or in any other assigned manner. After two points have been fixed, we have the situation shown below:

A	:	B	:	C
	z'_i		z'_u	

In this illustration, z'_i and z'_u represent values of z_i and z_u however selected. A represents the distance from the left end of the line to z'_i, B represents the distance from z'_i to z'_u and C represents the distance from z'_u to the right-hand end of the line. Obviously, $A + B + C = k$.

As the first step in finding the correlation coefficient between z'_i and z'_u, we seek the correlation between A and C. The correlation between A and C will be identical with the correlation between A and C measured from their means (which values we shall designate as a and c).

We shall prove first that $a - b - c = 0$

$$A + B + C = k \tag{1}$$

$$\Sigma A + \Sigma B + \Sigma C = Nk, \text{ where N is the number of items} \tag{2}$$

$$\overline{A} + \overline{B} + \overline{C} = k, \text{ where } \overline{A}, \overline{B}, \text{ and } \overline{C} \text{ designate the means of A, B, and C} \tag{3}$$

$$(A - \overline{A}) + (B - \overline{B}) + (C - \overline{C}) = k - k = 0. \text{ By subtracting (3) from (1)} \tag{4}$$

or $a + b + c = 0$

Let $V_a = \Sigma a^2$, $V_b = \Sigma b^2$, $V_c = \Sigma c^2$

The correlation between a and b is

$$r_{ab} = \frac{\Sigma ab}{\sqrt{V_a V_b}} = \frac{\Sigma a(-a-c)}{\sqrt{V_a V_b}} \quad \text{by (4)} \tag{5}$$

$$= \frac{-V_a - r_{ac}\sqrt{V_a V_c}}{\sqrt{V_a V_b}} \tag{6}$$

By an analogous procedure, the correlation between b and c is

$$r_{bc} = \frac{-V_c - r_{ac}\sqrt{V_a V_c}}{\sqrt{V_b V_c}} \tag{7}$$

By adding (6) and (7) we find

$$r_{ab}\sqrt{V_a V_b} + r_{bc}\sqrt{V_b V_c}$$

$$= -V_a - r_{ac}\sqrt{V_a V_c} - V_c - r_{ac}\sqrt{V_a V_c} \tag{8}$$

It is clear that the correlation between b and -b is -1. This fact permits us to determins r_{ac} in terms of r_{ab} and r_{bc}.

The correlation between b and -b may be written

$$r_{(b)(-b)} = r_{(b)(a+c)} = \frac{\Sigma b(a+c)}{\sqrt{V_b \Sigma (a+c)^2}}$$

$$= -1, \text{ by (4)} \tag{9}$$

$$= \frac{r_{ab}\sqrt{V_a V_b} + r_{bc}\sqrt{V_b V_c}}{\sqrt{V_b (V_a + V_c + 2r_{ac}\sqrt{V_a V_c})}} = -1 \tag{10}$$

or

$$r_{ab}\sqrt{V_a V_b} + r_{bc}\sqrt{V_b V_c}$$

$$= -\sqrt{V_b (V_a + V_c + 2r_{ac}\sqrt{V_a V_c})} \tag{11}$$

Subtracting (11) from (8) we find

$$V_a + V_c + 2r_{ac}\sqrt{V_a V_c}$$

$$= -\sqrt{V_b (V_a + V_c + 2r_{ac}\sqrt{V_a V_c}} \tag{12}$$

In order to solve (12) easily, let

$$q = V_a + V_c + 2r_{ac}\sqrt{V_aV_c}$$

From (12), then

$$q = -\sqrt{V_b q}$$

$$q^2 = V_b q$$

$$q = V_b$$

$$V_b = V_a + V_c + 2r_{ac}\sqrt{V_aV_c} \qquad (13)$$

And finally

$$r_{ac} = \frac{V_b - V_a - V_c}{2\sqrt{V_aV_c}} \qquad (14)$$

This formula then gives the correlation between a and c, or between A and C, where A + B + C = some constant value. It will be noted that this correlation depends simply upon the sums of squares of deviations from their means of the three series of values which have to add up to any given constant. Since V_a, V_b, and V_c are proportional to the variances of a, b, and c, this formula has a remarkably simple interpretation. It is, moreover, applicable to a large number of problems of this kind. For example, if one wants the correlation between p_1 and p_3, say in Table I, this correlation is equal to

$$\frac{V_2 - V_1 - V_3}{2\sqrt{V_1V_3}}$$

because $p_1 + p_2 + p_3$ = constant = 1.

It is now easy to show that the chance correlation between a and c is $-\frac{1}{2}$. If the points z'_1 and z'_u are fixed purely at random, so that each infinitely small segment of the line has an equal chance of being spotted, then in the long run $V_a = V_b = V_c$. Substituting V_a for V_b and V_c in (14) we find

$$r_{ac} = \frac{V_a - V_a - V_a}{2\sqrt{V_a{}^2}} = \frac{V_a}{2V_a} = -\frac{1}{2}$$

Now from the illustration at the beginning of this appendix

$$z'_i = A, \quad z'_u = A + B$$

$$r_{z'_i z'_u} = r(A)(A + B)$$

But $A + B = k - C$ from (1)

so that

$$r_{z'_i z'_u} = r_A (k - C),$$

where the right-hand member is equal to $-r_{ac}$. So we have finally

$$r_{z'_i z'_u} = -r_{ac} = +\tfrac{1}{2}$$

A NOTE CONCERNING INVESTIGATIONS ON THE CONSTANCY OF AUDIENCE LAUGHTER[1]

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Describing the timing of audience laughter as a really precise technique in social psychology, Gardner Murphy (1) cites as an example some of F. E. Lange's (2) work with crowd laughter. Her results indicate a striking constancy among different audiences. As Murphy states, "There were in each of the four performances 137 laugh episodes, no more no less. There was no incident[2] which produced a laugh in any one of the four performances which did not produce a laugh in any one of the other audiences. When, moreover, the lengths of laughs were compared, it was found that there was never a variation of more than one second between the length of a laugh of one audience in a situation and the length of a laugh in another audience in the same situation." These observations by Lange were made on four performances of the light opera, Iolanthe.

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1. Acknowledgments are due to Mr. Charles Prickett of the Pasadena Playhouse for the wholehearted cooperation in supplying excellent facilities for the observation of their audiences; to the Hal Roach Studios, Inc., for the use of the Dialogue Cutting Continuity of Babes in Toyland, and the opportunity to observe this film in Vienna; to Dr. Frank C. Davis, Assistant Professor at U.C.L.A., for guidance and criticism of the experiments and the manuscript; and to Dr. Neal E. Miller, Research Assistant, Yale Institute of Human Relations, who took unusual time in criticising the manuscript.
2. The italics are Murphy's.

Since the constancy of measurable group behavior is an important problem, it would seem highly desirable to determine to what extent the striking uniformity of this interesting example as a general phenomenon in the realm of audience reaction.[3] In a series of exploratory studies, two on plays in California and one on a motion picture in Vienna, the writer has tabulated the laughter of twenty-three audiences. While these studies have indicated certain responses that show relatively constant relationships between audience reactions and other factors, the results in each case have been markedly different from those secured by Lange.

In carrying out an investigation similar to Lange's, the writer performed a preliminary experiment to formulate a technique.

Preliminary Experiment. Materials Used: Stop-watch, pencils, numbered and dated recording sheets clamped to a copy-board, daily house reports.

Definition of a Laugh: In order to standardize the technique, a "laugh" was considered as any general overt voice-box response of the audience[4] that was elicited by the play, continued for at least a second, and could be observed auditorily. This eliminated tricky "spot-laughs," simplified "running-laughs," and ruled out sneezes, coughs, and strange chortles.

3. It is interesting to note that two prominent practical men in the field, the late Broadway producer Winthrop Ames, (3) and movie-comedy producer Hal Roach, (from an interview) entertain opposite views on this subject. Ames says that after laughs are "set," the audiences from Maine to Miami will laugh in the same places. Roach, in endeavoring to use a somewhat objective technique, followed one of his comedies in seven different show-houses one afternoon and found such huge differences in the various audiences that he gave up his study as hopeless.
4. It should not be inferred from this that the writer considers the audience to be a "group mind" or anything more or less than a special kind of a collection of individuals. An audience is considered to be a selected assembly of individuals situated together by their own assent for a common yet individually interpreted reason.

Procedure: Located in a false box off the balcony of the theatre where there was sufficient light to read the watches and record the data, two observers were directly by, but no in, the audience. From this point they clocked six performances of a new play, She Passed Through Lorraine.[5] Laughs in relation to the book were not considered. Only laughter of the audience in its chronological order was recorded.

Results: Besides offering the opportunity to develop a technique and to become adept in its use, the experiment showed that the range of the number of laughs per performance was 19 and the range of the total laugh-seconds was 89.5 seconds.

TABLE I

Showing each Performance of the Preliminary Experiment with its Individual Number of Laughs, Laugh-Seconds, and Size of Audience

Performance	Number of Laughs	Total Laugh-Seconds	Number of People
A	76	249.6	460
B	58	160.1	369
C	62	167.7	312
D	77	225.1	303
E	66	169.2	245
F	68	203.3	289

5. A rather high consistency was found to exist among the timings of two judges. In another study (not included in this paper because the ending of the play was changed after the first seven performances had run), one judge's data, treated separately, gave a correlation of P plus .844 between the number of laughs and the number of people while the other judge's data gave P plus .854. And in the correlation between the lengths of laughs and the number of people, this separate treatment gave P plus .733 for the one judge and P plus .773 for the other.

Main Experiment: With a definite technique established, every performance of a major play was attended and observed over a two weeks' period by one of the previously trained observers. The play was J. M. Synge's Playboy of the Western World, starring Douglass Montgomery.[6]

TABLE II

Showing each Performance of the Main Experiment with its Individual Number of Laughs, Laugh-Seconds, and Size of Audience

Performance	Number of Laughs	Total Laugh-Seconds	Number of People
A	102	306.6	607
B	113	371.2	647
C	134	437.2	635
D	110	325.1	574
E (Matinee)	98	279.1	520
F (Second Week)	134	416.5	734
G	50	139.3	190
H	60	153.3	455
I	71	198.2	360
J	69	196.5	372
K	74	233.1	459
L (Matinee)	49	78.7	311
M	70	202.3	454

Results: From these data it is immediately discernible that no such constancy as Lange found is evident. Rather than staying exactly the same for every performance, the number of laughs per performance had a range of 85, or in other words, there were

6. Although the Pasadena Playhouse is an amateur theatre, the productions, for the most part, are well-finished, and many of the actors have been experienced professional players. Therefore this presentation was played in a relatively consistent manner.

85 laugh situations which did not produce a laugh in every one of the other audiences. And the range in total number of laugh-seconds per performance was 358.5 seconds. One exceptionally long laugh in the show continued for 18.4 seconds on its best night and 9.0 on its worst. This is a difference of 9.4 seconds or over nine times as great as Lange found on her greatest variable. Thus it may be seen that the constancy which Lange's data suggests is not evident in these experiments.[7]

When the data are examined more analytically, however, a different constancy appears in these later investigations. There is a plus .901 P between the number of laughs per performance and the number of people in the audience, a rather certain indication of more laughs being elicited when more people are present. It is also indicated that the people will not only laugh oftener, but they will laugh longer as well. By correlating the number of people present per performance with the total laugh-seconds for each performance, the P is plus .916. And correlating the single long laugh previously mentioned with the number of people, the result is plus .78. This would seem to indicate that, when certain factors are controlled,[8] the audience does show a certain amount of constancy.

While these correlations are fairly high, they are still considerably distant from the perfect constancy which Lange found. By taking three performances (Table II, H, K, and M) which have virtually the same number of people present, the range of difference in the number of people is five or .01%, and the range of difference in the number of laughs for the same performance is fourteen or 19.8%. This indicates that even with the number of people controlled, audience reactions tend to vary.

Control Experiment: A factor which could cause this variation is the actor himself. Although in a good theatre, as a rule, the actors are highly

7. These experiments are supported by the testimonies of professional actors which tend to indicate that extreme constancy of the type found in Lange's data is a very rare phenomenon.
8. Lange's data did not include the number of people attending the four performances which she observed.

consistent in their playing, it is possible that slight differences may affect the number of laughs. To eliminate this factor, a motion picture audience was observed. The same technique was used except that recording the data was facilitated by recording directly onto the Dialogue Cutting Continuity.[9] Three performances were observed and the number of laughs per performance were 96, 117, and 112. One particular laugh ran the same length of time for all three while another varied from 8 to 4½ to 1 seconds. This variability, in reaction to a motion picture whose acting is constant and whose synchronization allows only a set time for laughter, indicates that the variability of audience reactions is not merely a function of the actor's variability.

Conclusion: It appears, from a comparison of the investigations, that Lange's findings are subject to reservations. While such reservations would not tend to indicate such constancy in audiences, a new factor of constancy was discovered. The rather high correlation between the number of people and the number of laughs in the main experiment indicates one factor which may be controlled and offers experimental data confirming Allport's (4) concept of Social Facilitation and delineates this concept from the closely related one of Rivalry. These findings suggest, as Knight Dunlap (5) has previously pointed out, that the objective study of theatre audiences should prove a profitable type of research in social psychology.

Summary: F. E. Lange, cited by Gardner Murphy, (1) has reported a striking constancy in laugh reactions of four audiences attending Iolanthe. At each performance there were exactly the same number of laughs and no one of the laughs varied more than one second in duration in any one of the performances.

9. The motion picture was Laurel and Hardy's Babes in Toyland, playing in the Rotenkreuz Kino in Vienna, Austria. Due to the difficulties surrounding an investigation in a foreign land, it was not possible to see the house reports. It appeared, however, that the size of the house was not grossly different for each of the three performances.

In three subsequent investigations, involving the observation of 23 audiences, the writer has not found such constancy. In a preliminary experiment to establish a recording technique, it was found that the range of the number of laughs per performance was 19 and the range of laugh-seconds 89.5. In the main experiment, it was found that the number of laughs per performance had a range of 85 and that laugh-seconds had a range of 385.5. In a control experiment using a motion picture, it was found that even the consistent portrayal and the synchronization of the sound did not elicit constant audience reactions. Although these experiments indicated that the type of constancy found by Lange is possibly somewhat of a rarity, they did not indicate that the realm of audience reactions is devoid of verifiable laws. A different type of consistency was found in the Main Experiment. In 13 observations of one play, the number of laughs per performance correlated plus .90 with the number of people attending. This relationship between audience size and number of laughs supports Allport's (4) concept of Social Facilitation, clearly differentiates it from its closely allied concept of rivalry, and tends to indicate, as Knight Dunlap (5) has suggested, that the measurement of audience reactions should be a profitable field for research in social psychology.

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JUDGMENT OF INTELLIGENCE FROM THE VOICE AS TRANSMITTED OVER A PUBLIC ADDRESS SYSTEM

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The purpose of this experiment is to determine the accuracy with which listeners can judge the intelligence of a speaker from hearing his voice over a public address system. Since the frequencies transmitted by a public address system are approximately the same as those transmitted by radio, we may assume that, other conditions remaining the same, any results obtained in this study would be somewhat the same as they would be if the voices were transmitted by radio.

Very few studies have been made of the extent to which personality traits and other characteristics of a speaker may be detected from his voice. Within the last few years, improvements in public address systems have permitted a serious attack to be made upon some of the problems involved in the relationship between the voice and certain personality characteristics. The public address system used in the present study was superior to any described in earlier experimental reports. A bibliography of previous studies and a detailed description of the public address system used in the present experiment may be found in another paper by the authors.[1]

The speakers were twelve 3rd- and 4th-year high school boys whose chronological ages ranged from

1. Fay, Paul J. and Middleton, Warren C.: "Judgment of Kretschmerian Body Types from the Voice as Transmitted over a Public Address System." Journal of Social Psychology (In Press).

fifteen years eight months to nineteen years three months. In the opinion of their high school teachers the boys were all equal in oral reading ability. None of the speakers had any speech defects. The twelve speakers who exhibited the greatest self-confidence and skill in speaking over a public address system were selected from a larger group after a preliminary audition. They were divided according to their intelligence into three groups of four each. The mean IQ's of the groups were, respectively, 126, 99 and 86.5.

The IQ's of the individual speakers are listed in Table I. These IQ's were derived from scores on the Terman Group Test of Mental Ability. The speakers did not know the purpose of the experiment nor did they know the basis of their selection. None of them were known to the listeners or seen by the listeners.

The announcer used a script similar in form to those used in professional broadcasting studios. The script was timed prior to the experiment. The monitor and the audition director also had copies of the complete script. The individual speakers had copies only of the material they were to read. Before the experiment the speakers practiced reading over the public address system. The material read in this practice session was not used in the experiment proper. The monitor recorded on his copy of the script the proper amplifier volume for each speaker; in this way the voices of all the speakers were equated for loudness.

The listeners were eighty-four students (fifty-six male and twenty-eight female) in psychology. They were given mimeographed rating scales which listed voice numbers from 1 to 24, Each voice number was followed by the scale -3, -2, -1, 0, +1, +2, +3. The program began with recorded music. The announcer then described the purpose of the experiment and informed the listeners that they would hear twenty-four voices. (Each of the twelve speakers was heard twice, but the listeners were not given this information.) The announcer stated that each speaker, announced only by number, would read a short selection. As soon as a speaker had finished, the listeners were instructed to rate him on the seven-point scale for intelligence.

Each speaker read a paragraph of interesting material that had a reading time of approximately

thirty seconds. In order to equate the selections for difficulty without the monotony that repetition of the same selection would have produced, one speaker in each intelligence group read the same material as one speaker in each of the other two groups. Since there were four speakers in each group and since each speaker appeared twice, a total of eight different selections, equated for difficulty, were used. In their first appearances the twelve speakers were heard in a random order; their second appearances came in a reversed order. The announcer called the number of each speaker before and after each one had read his material. Each selection was succeeded by thirty seconds of recorded music and every sixth speaker was followed by two minutes of recorded music.

The mean listener rating for intelligence of each of the speakers is given in Table I. Since the eighty-four listeners rated each speaker twice, there were one hundred sixty-eight ratings. There were no significant sex differences in the listeners' judgments. Table I also gives the reliability coefficients for the ratings of each speaker (the ratings for the first appearance of a speaker were correlated with the ratings for his second appearance and the resulting *r*'s were corrected by the Spearman-Brown formula). The corrected coefficient for all the speakers together (.55) indicates only a fair reliability. Considerable difference is evident in the reliability of the ratings of the different speakers. The range in corrected coefficients is from .13 to .60. There is some significance in the fact that the three speakers with the most extremely high or extremely low ratings (Speakers Ha, Bru, and Ke) all have reliability coefficients of .55 or higher. These speakers also have relatively low SD's (.99, 1.03, and 1.13, respectively).

The superior group had a mean rating of +.66, or 1.74 higher than the mean rating for the average group. As shown in Table II, this difference is 21.75 times the standard error of the difference. Statistically, then, it is decidedly reliable. The fact that the difference is statistically reliable, however, does not prove conclusively that listeners can distinguish speakers of superior intelligence from speakers of average intelligence. The difference between the mean ratings of the two groups is to a large extent due to the difference in ratings

TABLE I

MEANS, SD'S AND RELIABILITIES OF LISTENERS' RATINGS FOR INTELLIGENCE OF EACH OF TWELVE SPEAKERS OVER A PUBLIC ADDRESS SYSTEM

Speaker	Orders of speaking[1]	IQ[2]	Listeners' ratings for intelligence[3]		Reliability coefficient[4]		
			Mean	SD	r	PE	Corrected r[5]
Ha	6, 19	134	+1.90	.99	.38	.06	.55
Yo	11, 13	130	+ .48	1.07	.28	.07	.44
Bi	1, 24	126	- .17	1.56	.13	.07	.23
Le	9, 16	114	+ .43	1.56	.07	.07	.13
Superior Group Mean		126	+ .66	1.52			
Bru	10, 15	100	-2.10	1.03	.43	.06	.60
Bro	2, 23	99	- .54	1.41	.29	.07	.45
Ar	4, 21	98	- .73	1.49	.43	.06	.60
Ca	8, 17	98	- .96	1.25	.33	.97	.50
Average Group Mean		99	-1.08	1.45			
Bra	5, 20	88	+ .17	1.23	.41	.06	.58
Fo	12, 14	88	- .55	.98	.16	.07	.28
Ad	3, 22	85	+ .54	1.17	.15	.07	.26
Ke	7, 18	85	-1.64	1.13	.41	.06	.58
Inferior Group Mean		86.5	- .37	.98			
Total					.38	.02	.55

1. The two orders in which each speaker was heard over the public address system.
2. Terman Group Test of Mental Ability.
3. The listeners rated each speaker's voice for intelligence on a 7-point scale from -3 to +3. The number of listeners were: Male, 56; female, 28; total, 84.
4. Correlation of the listeners' ratings for the first time the speaker was heard with the ratings for the second time.
5. Corrected by the Spearman-Brown formula.

TABLE II

DIFFERENCES BETWEEN MEAN RATINGS FOR INTELLIGENCE OF SUPERIOR AND AVERAGE GROUPS OF SPEAKERS, AND BETWEEN MEAN RATINGS OF THE TWO JUDGED, RESPECTIVELY, MOST AND LEAST INTELLIGENT

	Diff.	σ (Diff.)	Diff./σ (Diff.)
Superior and Average Groups	1.74[1]	.08	21.75
Speakers Ha[2] and Bru[3]	4.00	.11	36.35

1. Difference in mean rating in favor of the superior group.
2. Speaker with the highest mean rating.
3. Speaker with the lowest mean rating.
4. Difference in mean rating in favor of Speaker Ha.

between speaker Ha (+1.90) and Speaker Bru (-2.10). The latter difference (4.00) is 36.35 times its standard error. Since, despite Speaker Bru's mean rating for intelligence of -2.10, he has a test IQ of 100, his voice quite clearly seems to be a low-intelligence stereotype. Possibly all the ratings that have relatively high reliabilities indicate voice stereotypes. The fact that some of them agree with the test results of intelligence may be purely coincidental.

The mean rating for the inferior group is .71 higher than the mean rating for the average group. The mean test IQ of the inferior group is, of course, only 12 less than the mean test IQ for the average group. The superior group, on the other hand, has a mean test IQ that is 27 higher than the mean test IQ of the average group. It would be difficult to find high school pupils who could be equated with these speakers in reading ability, and who at the same time would not average more than 73 or 75 IQ.

Additional studies are needed to determine more conclusively the extent to which listeners can actually judge the intelligence of speakers from

their voices as transmitted over a public address system, and to what extent the listeners' judgments are results of stereotyping. Our data do seem to prove the existence of voice stereotypes of superior and of inferior intelligence. On the other hand, there is a positive, but small, relationship between the speakers' IQ's and the listeners' ratings of their intelligence. The coefficient of correlation (r) between these two series of measures is .33 ± .01. It is possible, then, that intelligence as measured by tests is to some extent revealed in the voice. After all, the process of speaking is a form of behavior.

The tentative conclusions from this study--conclusions applicable only under the conditions existing in the study--may be summarized as follows:

1. The listeners were only fairly reliable in their judgments of the intelligence of the speakers whose voices were heard over a public address system.
2. The intelligence of some speakers was judged more reliably than that of others.
3. Listeners rated speakers of superior intelligence as somewhat more intelligent than they did speakers of average or inferior intelligence.
4. Listeners revealed some voice stereotypes of superior and of inferior intelligence.

SOCIOMETRIC PRACTICES ON THE CAMPUS

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The way students feel about their living arrangements and their group situations has been recognized by personnel officers in higher education as an important factor in the mental health of college students. Personnel officers realize that many students would group themselves differently, if they could.[1] Two illustrations of the use of sociometric techniques on the campus will be cited from the observation and experience of the writer in two institutions of higher learning: Stephens Junior College for Women and Stanford University.

I
Sororities at Stephens Junior College for Women

Stephens Junior College in 1922 began to experiment with the control and use of social sororities

1. The practices described in this report have been observed or developed by the writer (now on leave of absence from Stanford University for graduate work at Columbia) during the years 1930-1937. The relation of Sociometric Techniques to methods evolved during this experience is under study. A volume by the writer called, Social Adjustment Through Group Work: A Study of the Techniques and Processes of Student Life at Stephens Junior College for Women and Stanford University, will be published in the fall.

as an official agency for the promotion of educationally desirable social learnings. A Pan-Hellenic Division was set up as one of the major sections of the student Civic Association and certain functions were allotted to it for development and promotion. A Pan-Hellenic composed of two members of each of the sororities was organized and a faculty member appointed by the President to guide them as sponsor. Each individual group then chose a faculty adviser in conference with the Pan-Hellenic sponsor. Functions allotted by Faculty charter to Pan-Hellenic included: the control of sorority rushing, the administration of preferences and pledging, and the organization of new groups whenever the expansion of enrollment made that desirable and possible. The aim has been to include all students in an intimate social group of friends.

The Promotion of Expansiveness.

Rushing at Stephens takes place each fall in the sorority rooms provided by the college on the second floor of Senior Hall for an hour every night after dinner during the first weeks of school. Pan-Hellenic members of each group keep a guest register. Each time a new student visits a sorority room she signs the sorority guest book. The Pan-Hellenic members are given lists of all new students which they check each night with these guest registers. Rushing continues daily until every new student has been entertained by atleast two sorority groups. Even the least attractive girl is welcomed as the time for bidding draws nearer. As this plan works out, rushing ceases about the sixth or seventh week of the school year. After rushing has ceased, two weeks are taken up with a statement of preferences. Naive new girls remark over and over again during the first weeks of school that they had not anticipated that college could be "such a friendly place." The seniors put themselves out to be friendly to every new girl during the first two months of school and the homesick girl has become a rarity. A friendly period of emotional expansion has thus become assured.

Though there is a noticeable let-down after pledging--when attention turns in other directions--many of the networks established between individuals during the first weeks of school are strong enough

to last throughout the college experience and into later life--even when the group to which the senior belongs rejects the girl in its selection of membership. The acquaintance of individuals is greatly increased, and possibilities for follow-up are offered through many other channels. On a campus where the social situation is dominated by sororities, this technique has served to tide many new girls over the first few weeks of school when they have many adjustments to make, and to delay the deleterious effects of the sorority selective system until the new student has gotten some of her other adjustments under control.

Sorority Quotas

The total membership of a sorority group at Stephens was set in 1922 at 30; in 1937-38 the total membership was enlarged to 45, thus making more difficult the intimate small group experience which sororities were able to provide when the student enrollment was 500. Now that the enrollment of the institution has grown to over 1700, and the expansion of sorority opportunities has not kept up with the growth of the situation, the institution is faced with the responsibility of taking steps to reorder student life more satisfactorily for many individuals. But, be that as it may, at the time of this experiment--1922-1932--and up to the present time, the following practices in relation to sorority quotas have been in operation: The sorority membership quota is determined annually by subtracting the number of old girls who return to school from the total membership limit allowed. For example, if fifteen members return to school in the fall and the membership limit is 45, the sorority quota is 30 for that rushing season.

The Preference Plan

Sorority Preference Lists

Each sorority turns in to Pan-Hellenic three times as many names of students whom they desire as their quotas permit. If the "quota" is 30, 90 names are submitted. These names are arranged in three lists--first, second, and third choice lists.

Individual Preference Lists

On the same day, at an appointed time and place, each new girl fills out a printed preference card which includes the names of the (now) eighteen sororities arranged in alphabetical order and a space for "independents" who do not care to join a sorority but who would like to join in a social group with other independents.

Matching Choices

Pan-Hellenic, aided by their faculty sponsor matches individual choices with the sorority lists, matching first choices first, second choices next, third choices next, and so on. It happens frequently that girls prefer to join groups which do not have them on their first, second, or third lists. It also happens that a sorority group prefers girls who do not prefer it. Prestige usually favors the groups which have been longest on the campus; such groups will have many more girls wishing to join than they can take. The most recently organized group commonly has a very small list of girls preferring it.

"Wangling" Then Begins

Faculty sponsors then cooperate with each other and with their individual groups in persuading sorority groups which do not make their quotas to "reconsider" girls who indicated that they would like to join. Three preference lists are again prepared by the sororities and the process of matching begins again. By "wangling," it has been possible to fill all quotas before bidding is done. In 1931-32, out of 618 students, only forty-five did not receive invitations to join a sorority of their first, second, third, fourth, or fifth choice.

Sorores

Of the forty-five who did not join, 13 did not believe in sororities. These formed the nucleus of an independent group called "Sorores," which had a club room furnished by the college and carried on a social program very similar to that of the sororities. They had no ritual and no secrets, and membership was open to any girl on the campus not a Greek who cared to join. This group happened to have some of the campus leaders in it--including the editor of

the school literary magazine. Pan-Hellenic was responsible for including Sorores in its program of social training and they had representation on its board in "all-school" projects. Sorores included frequently the physically handicapped--in 1930-31 a girl who was a hunchback--and several others who were underdeveloped socially for their age. A number of girls each year broke their sorority pledges and joined this group. Despite the diversity of interest and personalities, it functioned quite satisfactorily. Such a group, however, requires unusually intelligent stimulation from its adviser.

Choice Limits

At first (before 1930) girls at the time of stating preferences were required to fill in all blanks (8 to 13 sorority groups) in the order of their choice. However, it was found from experience that girls who joined a group below their fifth choice were usually unhappy and often broke their pledges later in the year. This practice was therefore abandoned. Other girls also broke their pledges. When the records were examined, it was discovered that those who accepted choices below their third choice were most frequently those who broke their pledges during the year. If a girl found she liked the "independents" better than she did the group which she had joined, she sometimes broke her pledge and joined Sorores.

II
Choosing a Roommate in Union Unit at Stanford University

At Stanford University, where nine national sororities are well entrenched in the community pattern, a different policy for equalizing social opportunities on the campus has been in operation. Three residence units with trained personnel in charge have been established under direct university administration. The expansion of the number of sororities had previously been terminated by administrative fiat in 1918.

Sororities at Stanford are living groups which operate their own dining rooms and membership in the individual group has been limited by the University Administration to 30, on the ground that

individual problems in groups larger than that cannot be handled properly under amateur management. Thus, in a school which now has approximately 1250 women students, 270 may belong and live in sorority houses.

The sorority group at Stanford is an inflexible housing unit out of which a member cannot move if her interests or feelings change--without the disagreeable consequences of severing connections with the group. As a result, girls who join sororities which have lower prestige "ratings" quite frequently retain membership in their sorority group, despite the fact that they are "isolates." Isolates also occur in houses which the students rate excellent.

On the other hand, girls who live in residences operated directly under university administration have free movement throughout the residence system. Whenever their relations are not satisfactory in their living group they may move if there are vacancies. Certain times are set for "room choosing," and at these times women already on the campus indicate by the payment of a room deposit that they intend to return to school the following term. Each woman has first choice for the room in which she has been living.

The fee for all rooms in the university residences is the same, and although variety is encouraged, the university has tried to equalize housing advantages. Each living unit has certain advantages of its own. For instance, the most recent and beautiful housing unit is the farthest away from the main quad; the oldest has the traditions of years gone by; the in-between unit--from the point of view of establishment--is near the post office and is made up of small houses whose members eat in a common dining room in the Stanford Union--the center of many activities on the campus.

In the smaller houses of this last unit the rooms are frequently large and in some cases are occupied by two or three students who use them as places of study; sleeping is offered on enclosed small sleeping porches which are attractively and healthfully outfitted with single beds; in other cases three girls occupy two rooms.

The question of who is to share satisfactorily one's intimate living quarters is a question which involves attractions and repulsions in inter-personal relations and should be handled by discovering so far

as possible the set-up of psychological networks between the individuals concerned if girls are to be happy and contented and able to give their best to their academic work.

In three of these houses a sociometric technique was tried successfully (1936-1938). The resident assistants,[2] graduate women majoring in personnel work, asked each girl in the house to express her preferences for roommate or roommates (dependent upon where in the house she chose to live). These preference lists were analyzed and followed up by interviews. Usually some girls, either because they are somewhat isolated, or have formed new connections which they wish to explore, or because they prefer single rooms for health reasons or in order to concentrate on a schedule which is heavier than average, wish to move to single rooms in these houses, or to move to other houses where single rooms are available because of drop-outs.

After the resident assistant had all her data before her, the assignment of rooms within the house began. Mutual choices were taken care of first and were granted. Where a girl had more choices than she reciprocated, she was consulted. One instance occurs to the writer of a case which happened in the spring of the year when room-choosing for the following year took place. A sophomore going into her junior year was chosen by ten out of twenty-one people, none of whom appeared to be reciprocated by her. The resident head conferred with her about whom she would like to have live with her. She refused to choose any of the girls, saying she did not care to make a choice since she liked them all. She suggested that the girls draw cuts, and modestly remarked that she did like her room--which was attractive but which had never before nor since had that many first choices--and she did not blame anyone for wishing to live there. The procedure of leaving it to chance--by cutting--was carried out and she and her roommate both appeared well satisfied. The following quarter "tele," or inter-personal feeling, among the nine nine girls who had wished to live with her but who did not get to do so, had shifted and she drew no

2. These resident assistants were Misses Maurine Clow, Mariposa House; Lucie Lataillade, Manzanita Lodge; and Enid Olivi, Elm Cottage.

more first choices than several other girls who lived in the house. The following year, she decided that she wished to widen her acquaintance and chose a room in another house which had seventy residents, and a number of single rooms. She lived in a single, and though always well liked and seemingly well adjusted, was not so much the center of desire. She developed, however, into a house leader in student government, though she was never house president or a major campus officer.

On the other hand, girls who do not become wanted by the choice of others are a greater concern to the placement officer.[3] In such cases several techniques have been tried. In some instances, girls have been persuaded to help a shy girl. In other instances an upper classman has been asked to "take on" a new girl coming into the house for the first time to help her with her college adjustments. Individuals who had outstanding personality difficulties were sometimes helped directly with suggestions for personality improvement by the resident. One junior who had been a consistent isolate during her first two years--but who had excellent academic ability--was, for instance, advised to move to another house and to take on a younger student to see if she could learn to be more at ease with people. This she did and during her junior and senior years she took on a new girl each quarter for four quarters until she finally found a roommate with whom the relationship was cordial and mutual. During her first year of graduate work, she met an exceptionally talented graduate man and within a year she married him.

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3. The writer has been director of Union Unit at Stanford University since 1933. Before that she was head of the Extra-Curricular Division, one of five major instructional divisions of Stephens Junior College, Columbia, Missouri. In her capacity as guidance officer, she made a study of the campus community needs and of the interests and needs of students actually living on the campus (1930-31), upon the results of which many of the recent developments there have been based. Before that she was head of the National Camp Department of Girl Scouts, Inc., where she developed and wrote "Minimum Standards for Girl Scout Camps," the official camping standards pamphlet of the organization (1922-29).

Conclusions

On the basis of this limited experimentation, it appears to this writer that the new emphasis of sociometry on human inter-relations has much to offer guidance officers on college campuses in dealing with students. Those students who are ablest in intellectual work frequently need assistance in discovering how to make other people like them and a wider experience than they could achieve by themselves. Sociometric techniques, supported by individual conferences and corrective work with individuals, have something to offer to college guidance officers concerned with this problem.

REPORT

By
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Thirty-two children in the fifth grade have been tested sociometrically during the winter. It has been possible, by means of these tests, to gather objective data concerning the psychological currents operating within the group, to discover the emotional state of the children in the group and to correct inter-personal maladjustments in the course of seating and study re-assignments.

The criterion of seating was used for the tests. The greatest coöperation was received from the class, and by mid-year the time for retests was determined by the children themselves. From making only two choices at first, they progressed to making unlimited choices, one or two expressing as many as nine or ten choices, while a few expressed only one or two.

At about the middle of the year a successful attempt was made to have the children record their rejections. Over half coöperated in this experiment. The criterion used was that of "With whom would you not like to play at recess?" To be able to record rejections, as a regular sociometric process, was a new departure with children of this age.

At about this time in the school year, the element of time was introduced in order to provide a quantitative index of the choices and rejections. This met with success, and is the first experiment of its kind with younger children. The data were then tabulated by means of an algebraic matrix.

Through the knowledge disclosed by this study, it was possible to control to a considerable degree the behavioral environment of each child dur- school hours in such a way that conditions conducive

to emotional growth were provided. By improving the emotional state of the children it was made possible for them to derive more meaning from the whole learning process.

An article dealing with these tests will be prepared for publication shortly.

The American Sociological Society, meeting in Chicago next December, will provide a special room for the section on sociology and psychiatry, of which J. L. Moreno is the chairman. The room will provide space for exhibits, charts, etc., of sociometric and socio-psychiatric material. Individuals interested in exhibiting any material should get in touch with Dr. Moreno at Beacon, New York.

Miss Charlotte Moller, Training Supervisor at Burdine's, Miami, Florida, has undertaken a study of inter-personal relations among employees of her department store. The study, the first of its kind, will be undertaken in conjunction with a store-wide activity shared by all employees.

FOUNDATIONS OF SOCIOLOGY

By
George A. Lundberg

Sociology undergoes in this volume an extensive overhauling as preparation for the development of a more scientific theory of social process. In tart and vigorous language Lundberg attacks various hand-me-down concepts received from theology and literature, and substitutes new conceptual trappings which he believes perhaps less warm and comfortable but more durable and better-fitting.

He defines his field as the study of societal processes, "societal" being substituted here for "social" because of the varied meanings attached to the latter word. Sociology may also be described as the study of interhuman behavior, or of the behavior of the social group.

The first section of the book, an examination of the postulates basic to all sciences, amounts to an able defense of sociology as an objective field of inquiry. Strong emphasis is placed on the oneness of all sciences, a unity based on the fact that all study the same subject matter from different points of view. The "objectivity" of scientific data is not some quality intrinsic to them, since it is determined entirely by the amount of agreement which qualified observers exhibit as to the nature of such data. Any subject matter can become objective or agreed upon if it is defined in terms of the repeatable operations which must be performed in order to observe it. Satisfactory operational definition is usually reached only after many experiments. This theory of definition leads to the view that no science has more inherently objective data than any other. Sociological subject matter is "subjective" only in the sense that it has not been operationally defined to any great extent.

In the realm of quantification also Lundberg absolves sociology of any aberrant qualities. He shows that disputes over the more "subjectively based" measurements of sociologists are due to the theory that quantitative procedures must apply to some entity already defined. Instead he points out that measurement is itself a method of definition and is so used in the physical sciences, e.g., "space is what the ruler measures," etc.

The final point discussed is that, since the sciences are fundamentally one, their methods should be harmonious with each other and it should be both possible and intellectually economical to apply the same basic concepts and methods of logical procedure in all fields. This does not mean that sociological data should be expressed in units natural to the physical sciences, since to reduce mental events, for instance, to physical atoms would be both a cumbrous and sterile procedure. But it does mean that the same mathematical symbols and operations may profitably be applied to all scientific data.

Sociology, treated in this manner, can become a study of the social situation as a field of force undergoing energy transformation. The task of the social scientist is to measure the amount of energy present and the process of its distribution and redistribution. Scientific explanation as applied to such a field is determination of the pattern of forces acting on a given object. This type of explanation takes the place of former sociological methods by which individual phenomena were classified and then assumed to be "caused" by entities which were actually only names for the categories themselves. Thus flight from harm was "caused" by "fear."

Parts II and III of the book discuss the processes basic to societal phenomena and give a detailed consideration of the dynamics of the social group from the standpoint of field theory. Lundberg states that the societal event or social situation seems to structure itself naturally in a spacial manner, its changes may then be studied as motion in a field of force. The tendency of such regions is to move toward an equilibrium of forces as do physical fields. But unlike most physical fields social patterns, after being thrown out of balance and allowed to return to equilibrium, are not in the same

condition as before and represent stages in the course of social development. Thus social fields exhibit "a dynamic, a moving, rather than a static equilibrium."

These social areas may be presented graphically by means of non-metrical diagrams, crude "topological constructs." Such a diagram serves as perhaps a clearer substitute for verbal language, a transitional stage previous to the development of metrical treatment in algebraic terms. The author here makes no claim that topological diagrams are in themselves methods of measurement. He does state, however, that they present a possible way of making qualitative relationships as objective as are the quantitative, though he does not detail any methods by which this result might be achieved.

In working out the dynamics of group responses, Lundberg suggests that attraction and repulsion of individual elements may be the basic phenomena of the social as of the physical sciences. In this case the analysis of social attraction and repulsion may prove comparable in usefulness and theoretical gain to the study of electromagnetic events in physics.

The fundamental method of association between members of a group is designated as communication by means of symbols. This activity may be subdivided into association or approach and dissociation or withdrawal from other members. Coöperation, competition, and conflict can possibly be described as degrees of communication, but such definition has not yet been experimentally determined. Conditions making for the attraction or repulsion of group members may be tentatively defined as "certain likenesses and differences in characteristics and <u>status</u>," status being the rank of the individual in his group according to some social criterion.

Illustrations are given, showing the method by which pioneer workers are analyzing social fields. The author cites Dodd's experiment on social distance in which the subject chose members of different nationality groups and social strata for various purposes such as a visit, marriage, etc. The distance between subject and nationality-member could be measured by the intimacy of the relationship desired by the chooser.

A description is also given of Moreno's experiment on an institutional population in which

group-members chose each other for purposes of companionship, various criteria of choice and five levels of preference being used. This method enabled the experimenter to determine the structure of groups, differentiating out such types of association as the mutual pair (two individuals choose each other), the unreciprocated chain (A chooses B who chooses C who chooses A), the "star" or popular person, the influential person who, not popular himself, is associated with popular persons, finally the isolated or unchosen individual. The elementary structure consisting of an individual, those others to whom he is attracted, and those attracted to him, was designated as a social atom. The same person might be the nucleus of several social atoms according to the differing criteria of association used. At the same time he might be a peripheral element in other social atoms. It is to units such as these that societal phenomena may eventually be reducible.

On the whole this book produces an impression of definite new possibilities for sociology, issuing from the union of operationism and field theory. In fact operationism is so zealously defended that a one-sided view of scientific method is presented, and the function of definitions other than operational ones is obscured.

The course of scientific definition seems to the present reviewer to proceed from concepts which in their early form are relatively vague and inaccurate simply because they refer to characteristics of the data which cannot yet be expressed in any other way. On the basis of these concepts experimental hypotheses are formulated and tested until exact operational definition is possible. If operational definitions are attempted prematurely they may result in the loss of some of the meaning of the original data. Operational definitions thus appear as a gradual differentiation of parts from a relatively amorphous theoretical matrix.

Lundberg himself admits the importance of definitions in their early rough-hewn form and regards them as necessary preliminaries to the formulation of hypotheses. But he devotes proportionately so little space to this point and so vividly defends operationism that there is some danger of his book's becoming a bible for extremists.

As for field theory, it is supported in this book by the argument that it clarifies the social

situation, defining it more exactly and offering an improved type of causal explanation. This position is indeed receiving increasing experimental confirmation from such work as Dodd's measurement of social distance, Shaw's tracing of delinquency gradients, and the sociometric chartings of social groups by Moreno and Jennings. The concepts of attraction-repulsion, atomic structure, volume, and equilibrium have already been successfully used in sociometry and more intensive work is being at present carried on in the analysis of the social atom. The chemical concepts of absorption and saturation have been more tentatively applied in expressing the tolerance of a majority group for a minority. Other ideas relating to precipitation, osmosis, and molecular structure, might also conceivably be embodied in sociometric experimentation.

It may also be expected that the social sciences will develop new scientific concepts, just as chemistry has contributed ideas not previously found in physics. It is to be hoped that in their zeal to be harmonious with other sciences, social scientists will not overlook the possibility of such unique contributions.

Lundberg's volume must of course receive its final evaluation in the future, since it is frankly a preparation for action, a stripping down of theory to a few strong essential parts on which a superstructure of undetermined type can be erected. As such a framework this provocative book should brilliantly serve its purpose.

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